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Japanese Art.

THE collection of Japanese work got together at the rooms of the Society of Fine Arts is a remarkable one for the number and variety of its contents, and the special interest attaching to some of them; and for all who are interested in Japanese work it will probably be one of the artistic attractions of the present season. The exhibits have been to a considerable extent classified in the various cases, so as to afford opportunity of comparing various examples of each form of work; and some classes of Japanese production which are not very well known in this country are represented here, as we will note further on, much more largely than usual.

There are some defects in the arrangement, partly owing to the attempt to get into a small room a greater number of objects than can be completely shown in the space available; and there has been apparently no attempt to arrange objects chronologically; as usual in such exhibitions, they are placed more for effect. The dates are given in the catalogue in a good many instances, but the objects have not been well labelled, and for purposes of study the exhibition is not so useful as it might have been. The catalogue seems to have been compiled with a good deal of trouble, much of which is rendered nugatory by a bad system. The objects are to be identified by a small slip of card (somewhat on the South Kensington system), not very legible in many positions, not attached to the objects, but placed near them, and therefore liable to be misplaced (we found several upside down). There is no use in these slips if the catalogue is complete, and they are very difficult to read behind the glazing of the cases. The simpler as well as easier plan would have been to distinguish each object by a single number alone, large and legible, referring the visitor to the proper information under the same number in the catalogue. There are such constant failures in the cataloguing of exhibitions of this kind, from want of system, that it is worth while to call attention to this point, with a view to improvement in future similar cases.

We may observe also that the exhibition seems to have been planned, partly perhaps under the influence of some of the principal contributors, too much on a collector's and too little on an artist's plan. There is a great deal of nonsense among collectors about the relative value of objects of this kind, which are rated often not on their real artistic merits, but in regard to their date, their rarity, and other considerations quite unconnected with their real value from an artistic point of view. The commercial value of such objects is, of course, affected by such considerations, in the market for *curios*, but this has nothing whatever to do with their artistic interest or beauty, and, in fact, some of the objects apparently most valued by the proprietors are among the least interesting in the collection from an artist's point of view.

The two great defects in Japanese art are the want of feeling for beauty of form or outline, and the total want of perception of the true beauty and expressiveness of the human face and figure. This latter defect in itself at once puts Japanese art out of the highest category of art, whatever may be said about its wonderful picturesqueness and variety of decorative detail and representation of animal life. The power of representing the grotesque and humorous in human expression the Japanese have; perhaps we should say the farcical rather than the humorous, for their humour is of the "low comedy" variety; but beyond this,—in which, as far as it goes, they are really clever and original,—there is nothing in their figures but commonplace. There are some examples of figures done with serious intent in this collection, interesting because such attempts are so uncommon in Japanese work; but that is about all the special interest they have. There is a small bronze in Case Q, said to be a portrait-figure of a judge, standing with his arms folded, which has a quiet dignity very unusual in Japanese figures, and which seems to show that they might do more in this way if they gave their attention to serious figure work. This is a piece of seventeenth-century work by Ritsuo, who was an eminent artist in his day. The general defect of their figures must be from carelessness about this class of subject, probably from some theory about the unworthiness of the human figure; for it is impossible to suppose that a nation of artists who can draw animals with such spirit and fidelity could not do better with human figures if they gave their minds to the subject. The older class of figures, and also the older style of wood-carving, is exhibited in the two figures in two corners of Case Y, standing on animals. These seem to be intended seriously; they are apparently "heroic" subjects; the features and eyebrows are grotesquely exaggerated, but there is a rude power both in the attitudes of the figures and in style of the carving, very boldly cut and with no finishing up. The other extreme of figure treatment may be seen in two ivory groups in Case A, a woman and child, and a woman and tortoise. These are realistic to an extent not usually seen; they are full of most delicately-executed detail, but, from an art point of view, the woman and child is about on a par with such a work as the now too-famous group, "Oh! what a Dirty Boy!" in conception and feeling; in execution it is not equal to that piece of vulgarity.

The deficiency in feeling for form is exhibited in Japanese work, both in the want of fine line in the outlines of their jars and vases, and in their usual complete indifference as to any relation between the shape or construction of any article and the decoration applied to it. This latter peculiarity is almost ostentatiously displayed, as if the aim were to mask under the ornament the real construction and purpose of the object. We have never seen this peculiarity more exemplified than in the collection in New Bond-street. Case N, for instance, is entirely filled with small cases intended as medicine-boxes; a class of articles which are all pretty much of the same type, somewhat like rather thick and bulky cardcases, opening in the same way, only that the Japanese are not contented with making them in two parts only, they are often in three, four, or more parts, adroitly fitted one within another. The majority of these are covered with lacquered ornament, but in every case the ornament entirely ignores the jointing; and even when there is one joint only, the main feature in the decorative design is put right on the joint, as if to exhibit the cleverness of the artist in joining the two halves of his design. This is an example of the superabundant "cleverness" which is one of the interesting and at the same time one of the defects of Japanese work. Cleverness is not the best attribute of decorative design. In regard to the ignoring of the shape and make of the object again, look at some of the lacquered boxes in the case of things lent by Mr. Salting, in the middle of the room; floral ornament carved over one end part of the side and top of a box, ignoring the lid, and leaving parts of the top and end a bare ground. This kind of thing is a piquant variation on the more symmetrical disposition of ornament which has characterised the best decorative schools of the world; it is interesting as a variation of the idea of ornament, and those who first come on it after knowing only the symmetrical

types are naturally taken with it; and among us it is still, to a certain extent, a novelty, not yet worn out. But it would be found, if we filled our houses with Japanese work of that type for a generation, that it is just as possible to get tired of Japanese piquancy and irregularity as of Greek regularity; perhaps more so; and there is no doubt the Greek is the higher and more intellectual school, presenting, as it does, finer outline and constructive lines, if less picturesqueness of effect.

The defect of want of pure outline is felt constantly in many, perhaps in the majority, of the most richly-coloured and decorated pottery productions of the Japanese, and when pure form is found it is more often in small objects of comparatively minor importance. In Case E, for example, by far the best-shaped object is the small narrow tall crackle jar on the left (No. 28), with small lion handles. This is as pure a piece of form as anything Greek, and probably if it had been ornamented, it would have been more or less spoiled by ornament put on irrespective of its shape. Compared with the large modern Satsuma jar on the shelf immediately above this, the plain crackle jar is a much more artistic object; the handles of the large jar referred to (No. 6) are ugly, meaningless lumps awkwardly stuck on, and with no connexion at all with the design. This bad constructional treatment of the handles is what one constantly meets with in Japanese pottery, together with a constant preference for rounded and bunchy-looking curves, deficient in refinement and delicacy of curvature. It is important to insist on these deficiencies of design in Japanese art, because it is run after so much as a matter of fashion, and the beauty and richness of the surface work lead many admirers to forget that surface work is not everything, and that outline and grouping go for something also in decorative design.

Among the minor objects which present a contrast to the bulk of Japanese work is a very interesting collection on the bottom shelf of Case B, consisting of small tea-jars, the form and make of which have, we understand, a kind of traditional significance in Japan. These are of severe simplicity; small self-coloured brown jars with turned circular ivory lids; they appear to represent an old form kept up through all modifications of later tastes, and might be supposed to belong to another world from that of the majority of the objects in the collection; and, plain as they are, they are more satisfactory to the critical eye, more purpose like in design, than some more elaborately-worked objects. Speaking of the suggestion of antique types, there is in Case E, on the right (No. 19 on the catalogue ticket), a curiously antique-looking bit of old Satsuma ware, stated to be sixteenth century, but looking absolutely pre-historic; it is a small brown jar, with concentric bands of ornament formed by markings and scorings, just in the same style as on the archaic Greek vases in the British Museum. Taken in connexion with the usual style of Japanese design, and that of the modern Satsuma ware in the same case, this small jar or bowl is quite a little art-history puzzle. It looks as if history of this kind also had a tendency to precisely repeat itself in the beginning period of any artistic pottery manufacture.

Among the objects which have excited a good deal of curiosity and comment are the collection of sword-hilts in Case B. There are flat pieces of metal about 3 in. wide pierced in the centre for the sword blade, and ornamented with all kinds of devices, in many cases of very beautiful and delicate execution; giants and monsters in grotesque wrath are the predominating subjects, with a certain obvious reference to the warlike purpose of the articles. The knife handles in the next case are worth attention, they are remarkably varied and fanciful in their decoration, and include some exquisite bits of work. Among these is one showing a bas-relief of what seems to be a mermaid, only with a tadpole's instead of a fish's tail. The variety and fancy of the ornament bestowed on this small utilitarian implement is very remarkable; as usual, it has no reference to the shape of the handle, which is a simple straight piece 4 in. or 5 in. long and a little over ½ in. wide; the handle is, after the usual Japanese fashion, merely a space on which ornament can be put; and in some cases the relief ornament is inserted with little regard to the convenient use of the handle by the holder: but the Japanese are not alone in that kind of oversight.

The porcelain objects in Case F are of interest, not so much from their artistic merit, as for the suggestion they give of the origin of some European developments of porcelain, such as Dresden, the origin of which is more Oriental than might be supposed. The coloured figure in Imari ware (No. 25 in this case), and of the date of about the middle of the seventeenth century, is the kind of thing that, allowing for the difference in costume, might have been a Dresden china production; and there are two or three other objects, jars, &c., in this case that have a remarkably Dresden look. Some of the smaller objects here are very artistic, but the bulk of them are curiosities rather than objects of artistic value. Nor can we care for the realistic group of rats, wonderfully cleverly finished as they are, in the centre of Case G. The thing to look at in this case is the large seventeenth-century jar, numbered 2,—a chrysanthemum design on a crackle-ware ground, which has a subdued richness reminding one of old stained glass. A tall crackle jar just below this, in the corner of the case, with handles formed by dragons looking over the edge, is a fine and characteristic piece of work as far as colour effect and surface design are concerned, though, like so many finely-coloured works in Japanese ware, bad and clumsy in form. Among the pottery work we should not pass over the fine specimen, No. 30 in Case E, belonging to Mr. Hart (who is one of the largest contributors),—a double vase, with a perforated exterior wall, so to speak, showing the inner one through; eighteenth-century Satsuma ware, and a very grand piece of work of its kind.

The large centre vase in case K is an object of curious interest in its way; the sides are decorated by vertical ribs or scallopings covered with small diapers of different colours, and with two large panels showing gorgeous groups of flowers (we use the word "gorgeous" advisedly) on a white ground. This is a vulgar piece of work, not Japanese in feeling as we are accustomed to regard Japanese work; and the story is that this represents the kind of thing which, before Japanese art was "discovered" by Europe, was alone allowed to be exported to foreign countries. There is a curious half-suggestion of the Sèvres type about this. The large jar to the right of it, however, classed as of the same period and style, though equally "loud" in colour, is a much more striking and less commonplace affair. This case contains in front two plates finely designed with a crane's neck and head in the centre, the wings nearly encircling the plate, bearing a white centre round the bird's head. This is a fine *motif* in design. The two small jars and saucers numbered 11 in this case should also be looked at; they are fine bits of work, far superior in artistic feeling to most of the larger and more showy things in the same case.

The exhibition is very rich in lacquer work, of which there are more examples than of any other class of work, many of them very beautiful in detail and affording striking contrasts in style, but dates and styles are all mixed up together, and thus an opportunity of showing progressive development, or, as some think, deterioration in the class of work is lost. Your collector values the old examples, some of which, however, are of little value enough artistically. There is one, 14 in Case S, which is lauded as one of the most remarkable and forcible examples. It represents the figure of a man (badly foreshortened) with what looks like a tremendous bundle of sticks tied behind expressed in gold and green; the ground of the whole is black, with a slice of gold irregularly cutting off the lower part; the face and hands of the figure are inlaid in mother of pearl. It is a curious and characteristic thing, but it is about as ugly and un-decorative as anything well could be, and from an artistic point of view is not worth having in comparison with many of the later and (we presume) less valued works. That is what people come to when they look to mere rarity or age and not to artistic design for the value of a thing, and thus pervert their own taste and, perhaps, that of others.

It must be admitted, however, speaking generally, that a great deal of Japanese lacquer work represents a beauty of surface and general effect rather than a real beauty of design. The appearance of the delicately-finished gold sprays on the black ground, powdered here and there with gold, is so rich and so truly decorative, and presents such an appearance of delicate finish and painstaking labour, that the eye is quite taken captive by it; but if we saw the same designs sketched on paper, they would hardly attract much attention. This is a typical illustration of what we take to be the real truth about Japanese art (though we know this is a most unfashionable sentiment), that it is the art of cleverness and consummate patience and conscientiousness of finish, rather than of intellectual interest. What the Japanese aim at doing,—or aimed at doing, in the past tense, we might, perhaps, more correctly say,—they did with the greatest skill and patience, and with an innate feeling for colour and for decorative effect; but there is no intellectual power in their work, and a great want of perception of the beauty and value of pure form in decorative design; and on this account we doubt if, after the fashions of the present generation of connoisseurs have passed away, their art will ultimately retain the place among the artistic productions of the world which is now claimed for it. But however that may be, the present exhibition is well worth seeing, and the public are indebted to those who have got it together, and to those owners of Japanese work who have so liberally lent their treasures for exhibition.

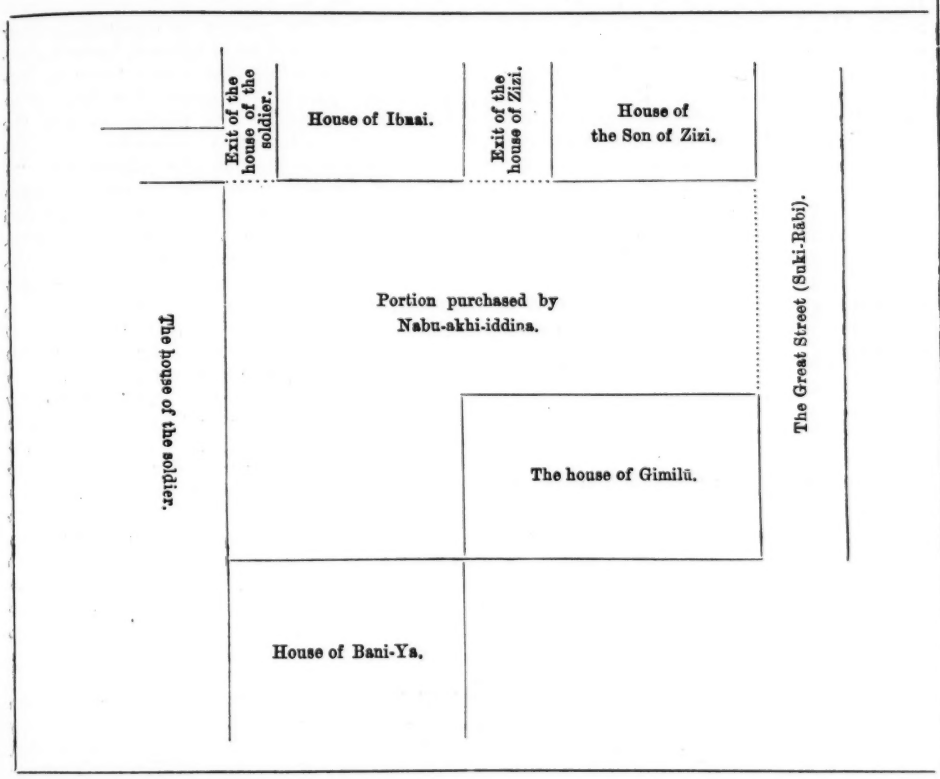
BABYLONIAN HOUSES AND HOUSEHOLDERS.

THE ancient writers who visited Babylon have handed down to us wonderful accounts of the mighty edifices which formed the glory, not only of the queen city of Western Asia, but of all the ancient world. With accents of wondering astonishment they have described the great temple of Belus, with its golden image and lofty storied tower, the hanging gardens, and the palace of the great king; but none of them have thought fit to hand down to posterity an account of the city proper and the homes of the Babylonians therein. Herodotus has described the massive ramparts, with broad gateways, which guarded the city, and the quays which lined the river banks; but of the houses of the people and the general appearance of the city he gives no account whatever. What manner of city was it upon which the *Kake*, the muezzin of bygone times, looked down, as four times a day from the lofty tower he called the faithful Babylonians to prayer? This is a question which finds no answer in the writings of the ancient tourists, and which can only be satisfied by a study of the records of the great city itself.

The numerous tablets which have been discovered in the record chambers of ancient temples or in the buried counting-houses of such merchant princes as the sons of Egibi, are the sources to which we must appeal for our answer, and it is no stinted answer which they afford.

The mathematical accuracy which the Babylonian revealed in all he undertook, from the drawing of a minute group of cuneiform characters to the careful laying out of some vast temple or palace, naturally asserted itself in all matters relative to lands or estates, and these, therefore, afford much information as to the topography of the great city of the East. In every case where land, either for building purposes or cultivation, changed hands, the boundaries, approaches, and exits were always carefully enumerated and measured, and even, in some cases, a plan attached to the deed. As an example of this, we may take a very fine deed of sale of building land dated in the twenty-

sixth year of Nebuchadnezzar, king of Babylon, that is, B.C. 579, in which the details of the land, its boundaries, measurements, and price are given. The land in question is described as being "seventeen kanes four cubits of building land in the district JE, which is within Babylon." It is probable from the wording of the deed that the house was already commenced, but not finished. This transaction is of particuiar interest, for the purchasing party is Nabu-akhi-iddina, son of Sula, the then head of the Egibi firm. The statements of the boundaries, twice enumerated in the deed, are so accurate as to enable us to construct the following plan, and thus restore a portion of ancient Babylon :—


Exit of the house of the soldier.
House of Ibnai.
Exit of the house of Zizi.
House of the Son of Zizi.
The house of the soldier.
Portion purchased by Nabu-akhi-iddina.
The Great Street (Suki-Rabi).
The house of Gimilu.
House of Bani-Ya.

It will be seen at once how the houses were clustered together in this ancient city, just as in the modern towns of Mossul, Baghdad, and Hillah; and it was very important, therefore, that rights of exit into the public streets or bye-ways should be very carefully protected, and thus we see the exits of the house of the son of the soldier and that of the son of Zizi most carefully mentioned, and the street-frontage of the new house of Nabu-akhi-iddina secured. No doubt disputes often arose as to these rights of way, as in modern Mohammedan towns, and of this a most interesting record is preserved among the papers of the Egibi firm. Notwithstanding the care with which these precious rights are specified in the above document, we find that twenty-three years later, in the first year of Nabonidus, a dispute arose as to this very property, and the rights of way attached to it. Among the papers is the judgment, dated "in the month Ve-ader, on the twenty-fourth day in the first year of Nabonidus," B.C. 554, in which we read:—"Merodach-irba, son of Rimut, son of Mizrai, and Kalba, son of Balatu, son of the Chaldean, in their going forth over the brook shall go forth, but upon the exit of the boundary of the house of Nabu-akhi-iddina, son of Sula, son of Egibi, they shall claim not. The exit over the boundary of the house of Nabu-akhi-iddina is his [own]." Thus, therefore, even twenty-five centuries ago disputes as to rights of way were decided in the courts of Babylon. In order to guard against disputes, all deeds relating to lands or houses were most carefully drawn up and attested by several witnesses, and sealed with the seals of the contracting parties. The original owner of this land was Morouk-sapik-zeri, son of the priest of Ninip, who received for his property the sum of $6\frac{2}{3}$ mana $2\frac{2}{3}$ shekels of silver. At the end of the deed comes a strange attestation. "By the spirits of Nebo and Merodach their gods and the spirit [life] of Nebuchadnezzar the king, their lord, they swore to one another." The rich representative of the house of Egibi, it will be observed, had secured for himself a portion fronting the "Great Street," no doubt one of the main arteries of the great city. In other tablets we have mention made of the "King's Road" and of the "Street of Bel," and the "Street leading down to the River," while both in the inscriptions of Nebuchadnezzar, and in the religious text, mention is made of the "broad places" or squares. An idea of the number of houses in the great city may be gained from the large number of tablets relating to rents and mortgages which are found among the papers of the Egibi firm; and it must be borne in mind that they are no doubt but one among many such firms in the city of merchants. One little tablet that may be of special interest is a veritable Babylonian rent-roll, collected. The tablet is headed "Silver, the rent of houses which are within the city, which for security [?] he had given in the month Kislen, 15th day, in the 5th year of Nabonidus [B.C. 550], king of Babylon." Then follow the names of the householders, and the rent each paid, and at the end the total, "One mana, two shekels and three-quarters,"—an average of not quite two shekels per house.

From the numerous rent-tables in the collection it will be quite possible, when sufficient are compared, to ascertain the value of house property with complete accuracy. Rent was payable yearly, half yearly, or monthly, and in all cases a receipt was given of this class. The following is a good example :—"The rent of a house which is from the first day of Tammuz of the second year of Nerigrissar, king of Babylon, to the first day of Tammuz of the third year of Neriglissar, king of Babylon, Bel-ukin from the hands of Suma has received; also ten shekels of silver as security for the new year, which is from the first day of Tammuz, of the third year of Neriglissar, king of Babylon; Bel-ukin from the hands of Suma has taken." The glimpse which these ancient tablets afford us of the Babylonians at home is one far wider, far more intimate and popular, than that afforded us by the meagre writings of the so-called "father of history."

The Sanitary Registration of Buildings Bill.—A public conference as to this measure is announced to be held in the hall of the Society of Arts, John-street, Adelphi, on Saturday, February 4th.

INDIAN RAILWAY EXPERIENCE.

THE able paper by Sir Juland Danvers, referred to in our "Notes" on the 24th ult., on the defects of the English railway statistics, demands more than a passing comment. It is a contribution of great value to one of the most important inquiries of the day. In the face of the present tendency towards the migration of labour, the importance of clear, honest, and reliable railway statistics becomes cardinal. The subject requires to be removed from the arena of struggle between carriers and their customers for mere convenience or for lower rates, to the level of an industrial problem the solution of which is a matter of national importance. For that solution the value of statistics is paramount. There can be no doubt that the meritorious attempts which have been made by successive Governments to improve the state of our railway service by legislation have failed from the want of the basis of knowledge of actual facts. While one party has been anxious to obtain a reduction, and the other party an increase, of rates, the Administration has been unable to exert any intelligent influence on the debate, from its total ignorance of how much any particular class of traffic actually costs. How easily and how thoroughly that knowledge may be obtained has been shown us ten years ago by Mr. Rae, the Commissioner of Railways in New South Wales, and by his successor, Mr. Goodchap; and now Sir Juland Danvers adds the fruit of his long experience on the Indian lines to the enormous mass of evidence, drawn chiefly from foreign sources, that has been grouped together by English statists, and disregarded alike by the railway managers, the public, and the Government.

The first requisite to a knowledge of the principles which underlie the determination of the best paying railway charges is to understand the capacity of a railway for traffic. It has been tacitly assumed that this, if not absolutely unlimited, was at least as great as that of an ordinary canal. Nothing can be more erroneous. The subject can be investigated, and has been investigated, as a mathematical question; but it is, perhaps, more likely to command attention when it is treated as a matter of practical experience. An ordinary canal can convey 2,000,000 tons of traffic in a year, while an ordinary English railway only carries 656,000 tons of net load as a general average. The Suez Canal, in a very imperfect condition, has given passage to more than 7,000,000 tons gross in a year. The English railways of maximum mixed traffic rise to nearly 1,500,000 tons of net transport, or 4 600,000 tons gross, but at an enormous outlay of capital. A remarkable instance of the limit of railway capacity is furnished by the records of the metropolitan lines, where trains follow one another not five minutes apart. But the result here obtained of 12,000,000 tons gross in the year has only effected the transport of under 700,000 tons of net load. The conditions of this heavy duty are most instructive to study; the main condition which renders it physically possible to run so many trains in twenty-four hours being that they all run at one speed, and all stop for equal times at the same stations. It is true that only the special peculiarities of the passenger traffic, which loads and unloads itself, and does not require the enormous station accommodation necessary for the conduct of heavy goods traffic, render possible this prodigious duty. On the most important French lines the maximum net load conveyed is under 525,000 tons per annum. The railways of the United States convey 2,000,000 tons gross in the year, that is to say, about the same amount of gross that the English canals will convey of net transport. These facts are enough to show that the study of the capacity of a pair of railway tracks for traffic is one of the primary steps to be taken in order to lay down any rules for general conduct, and the first fruit of the inquiry is the discovery that the full capacity is only attainable when one kind of traffic is carried over the line, and that in proportion as the speed of the different trains varies, that capacity is sharply restricted.

It results from these data (which may be consulted in the Appendix to the Report of the Select Committee on Canals of 1883), that the capacity for traffic per 1,000*l.* of capital expended is 16,600 ton-miles net on an average English railway; 21,300 ton-miles net on an average French railway; 20,000 ton-miles net on an English railway of maximum mixed traffic, and 200,000 ton-miles net on an ordinary canal.

On this important element of railway statistics, the tables now published by the Statistical Society are not of such direct value as those contained in the New South Wales Railway reports. On the other hand, the ultimate result of the cost of transport per unit is perhaps more distinctly brought out by Sir Juland Danvers than by Mr. Goodchap. "I have no hesitation," writes the Government Director of the Indian Railway Companies, "in saying that this information furnishes the only sound basis on which economical management can be tested; and that it has been most usefully employed in a great number of cases. The same information is included in Colonial and Continental Railway returns, and is given in a most complete form in American Railway statistics; but it is studiously excluded from the accounts of English railways. The attempt to draw comparisons between the working of English and other lines is thus baffled, and the means of obtaining reliable results are withheld." It is the object of the paper cited "to induce the railway companies of this country, who are certainly entrusted with interests which affect alike the capitalist, the merchant, the agriculturist, and the general community, to supply a defect in the statistical returns of railway working, in order that a more safe and reliable guide for purposes of efficient and economical management than is now given may be provided." We wish we could entertain the hope that Sir Juland Danvers will be more successful than his fellow labourers in the same work have hitherto been in attracting the attention, not only of railway managers, but also of railway proprietors, to a matter so closely affecting their pockets. The great point in our opinion,—and we have no doubt that the able Indian administrator will agree with us,—is that the matter should be regarded from a national point of view rather than from the standpoint either of the freighter or of the carrier. For good or for evil, productive labour in the country is engaged in a hand-to-hand struggle with foreign productive labour. If the latter advances with the same proportionate activity that it has displayed in the last ten or twenty years, the great centres of English industry can hardly fail to droop and sicken, and the traffic of our railways will do the same. It is altogether idle to talk of meeting the danger, in whole or in part, by reduction in railway charges, unless we know what are really railway costs. And no less essential is it to the companies, as well as to the public, to understand how their actual establishments can be utilised so as to perform the heaviest duty for 1,000*l.* of capital laid out. This subject may be described as almost virgin, and yet on its elucidation may hereafter depend the fact whether any given railway shall continue to work or shall become derelict.

It is not to be supposed that we shall be able, on the English railways, to carry a passenger for a mile for half a farthing or a ton of goods for a farthing, which are approximately the prices on the most important of the Indian railways. But the fact that on a passenger traffic carried on on a fare of a farthing a mile, a reduction of one eighth, and in some cases of one quarter on that small price produced an increase in the number of passengers, leading to a satisfactory increase in receipts, can hardly be called less than marvellous. "The lowest rates for staples, such as grains, seeds, and salts, are from $\frac{1}{2}$d. to $\frac{1}{3}$d. per mile." On the East Indian line the profit on the passenger traffic (stated as a percentage on the actual working cost) was 230 per cent., and that on the goods traffic 175 per cent. in 1886. No one can imagine that prices like these could be attainable on English railways. But what we have a right to know is, what are the corresponding figures on our lines? The average number of passenger miles per year on the Indian railways is about 310,000 per mile of line. The average number of ton-miles of goods is 270,000 per mile. The English lines, as closely as can be ascertained in the defective state of the statistics, convey about one-sixth more passengers and two and a half times the weight of goods, as compared to the Indian lines. But no one can tell what it costs on the English railways to convey either a passenger or a ton of goods for a mile. As nearly as it is possible to calculate, the average passenger fare on the railways of the United Kingdom is a little under nine-tenths of a penny per mile, against $\frac{3}{4}$d. per passenger mile in France, $1\frac{1}{4}$d. per passenger mile in the United States, and $\frac{1}{4}$d. per passenger mile in India. For the transport of a ton of goods for a mile, $1\frac{1}{4}$d. is received in England, nine-tenths of a penny in France, eight-tenths of a penny in the United States, and $\frac{1}{2}$d. in India. The railway rates of the United Kingdom are thus, in most respects, the highest, while the return to the shareholders is generally the lowest, of the cases compared. Does not this point to the conclusion that great advantages are possible, both for the railways and their customers, if we only take the trouble to ascertain what are the facts that have so unfavourable a result for the English railways, as compared with those of countries that have long ceased to work in the dark, and that are able to give a clear account of their business?

NOTES.

THE students' drawings at the Institute make a fine show, equal to most that we have seen on similar occasions. Mr. Horsley's drawings as Owen Jones Student, including a number of very interesting sketches of coloured work, Mr. Maclaren's drawings as Pugin Student, and Mr. Paul's drawings in competition for the Pugin Studentship, which has been awarded to him this year, form the most interesting portion of the drawings; in the award of the Pugin to Mr. Paul we concur, though Mr. Mitchell runs him pretty close. Mr. Paul's drawings show a considerable variety of work, including an excellent coloured drawing of a mediæval pastoral staff at Wells, and some admirable freely-sketched views of Wells and other churches. The Soane Medallion Prize design, by Mr. Prentice, is unquestionably the most original and effective, though it is not, to our thinking, quite in keeping with the idea of the subject for the prize, "A Gentleman's Country House"; the ponderous gate tower, with its corbelled-out turrets, is rather too military-looking, but it is a very picturesque piece of design. There are more competitors for the Tite Prize than usual; the award goes to Mr. Kenyon for a design which is the most "correct" of the set, and what Tite would have liked best, but it is not so original or pleasing as Mr. J. J. Pearson's, which seems to fulfil better what ought to be the object of this prize, to encourage new treatment of buildings in the style and with the details of Italian architecture. On the other hand, Mr. Masey goes too far afield, and sends a design which is really more Gothic than Italian in feeling, and such as Tite would never have recognised as "Italian" at all. The elevation is spirited, but the detail wants the refinement which should characterise Italian detail. For the Silver Medal Mr. H. Percy Adams, with his drawings of Dennington Church, is *facile princeps*, but Mr. Cox's Medal of Merit for his Hampton Court measured drawings is well earned. Mr. Marshall, the successful competitor for the Grissell Medal, sends an excellent study for the groining of an apse and adjoining bay of a chancel: he has shown very carefully the various points in the springing and mitreing of the groin ribs, and the whole is very thoroughly worked out. We wish there were more competitors (only two) for this prize, the only one which encourages scientific constructive work.

A DECISION of Mr. Justice Smith of much interest to many of our readers is reported in the January number of the Law Reports. We refer to Crampton and Holt *v.* Ridley & Co. and the Trustee in Bankruptcy of Winby (20 Queen's Bench Division, p. 48). A dispute arose between Ridley & Co. and Winby as to the use of a licence for a certain invention, and it was finally referred to arbitration, and in addition an umpire was appointed. The action in question was subsequently brought by Mr. Crampton, the umpire, and Mr. Holt, one of the arbitrators, for their fees. The total amount of the fees claimed by the two arbitrators and the umpire, we may observe in passing, reached 328*l.*, a much larger sum than if the case had been heard before an Official Referee, seeing that this sum has nothing to do with the cost incurred by the parties in conducting their case. The main point of interest, however, was whether in what we may term a trade as distinguished from a legal arbitration there is an implied promise by the parties to pay the arbitrators a reasonable remuneration. Mr. Justice Smith replied in the affirmative. "I believe," he said, "the law to be that upon such an arbitration (a purely mercantile and business one), as we are now dealing with, there is an implied promise by the parties appointing the arbitrators and umpire jointly to pay them for their services." So far as regards a legal arbitrator, the balance of authority is against there being any such implied promise, nor are we aware of any decision which gives this privilege to lay and business arbitrators until that upon which we are now commenting. The effect of the decision must be far reaching, for henceforth any persons who in a business dispute appoint arbitrators alone or with an umpire will be liable to be sued in a legal action for a reasonable sum in respect of the fees payable. Such a result is satisfactory, because arbitrators not unfrequently after giving much time and labour to the solution of a dispute have had to go without remuneration.

THE old adage that more haste is worse speed is well exemplified in the recent case of the Queen *v.* Poulter. The London, Tilbury, & Southend Railway Company acquired certain land and began to build warehouses on it, which, when completed, were to be 100 ft. high. Messrs. Poulter were lessees of buildings immediately fronting the site of the Company's new buildings for a term of seventeen years, determinable at the end of the first or third year by six months' notice. One such notice could expire in November, 1886, and in April, 1886, Messrs. Poulter drew the attention of the Railway Company to the injury likely to be done to them by the loss of light caused by the erection of the new warehouses. But the Company would not enter into negotiations, and so in May Messrs. Poulter gave notice to end their lease in the following November, and in September made a claim for compensation as persons injuriously affected by the Company's works, claiming as though lessees for the full term. The jury gave an alternative verdict, viz., 3,000*l.* on the claim of Messrs. Poulter, or 450*l.* if they were not entitled to claim as lessees beyond November. The matter then came before the Queen's Bench Division, and finally before the Court of Appeal. It goes almost without saying that the Court held that Messrs. Poulter were entitled only to 450*l.*, for, as a matter of fact, in September they were lessees only till November 11. Moreover, the cessation of the lease was not the legal, because not the necessary, result of the action of the Company, and so any loss resulting from such cessation could not form part of the basis of compensation. In fact, if we look practically at the matter, it is clear that the possibility of breaking the lease prevented Messrs. Poulter from being injuriously affected except for a few months, since it enabled them to leave the premises. The erection of the buildings was, no doubt, a motive for such move, but it could no more found a claim for compensation than if a railway company were to take away some station, and so cause the owners of neighbouring warehouses to move to others.

COMPLAINTS as to railway charges, as usual, herald the meeting of Parliament. The charge of 55s. per ton for carrying a propeller, weighing 4 tons 19 cwt. 1 qr., from Hartlepool to Bristol, is one instance recently brought forward; the rate being not far from double the freight of the same article from San Francisco or from Calcutta to that port. Another complaint is to the effect that the London and North-Western Company charge 40s. per ton for the conveyance of New Zealand meat from London to Liverpool, while at the same time they carry American meat from Liverpool to London for 25s. per ton. The latter case is rendered more invidious from the fact that, as the chief bulk of railway goods traffic is up, or London-wards, back freight is especially desirable, and, if differential charges are allowed, ought to be carried at a considerably lower rate in vehicles which must go back from the metropolis, whether full or empty. It is not with the view of deferring legislation on the subject, but rather the reverse, that we urge on all who have a voice in the matter the absolute need of obtaining such accounts from the railway companies as the Board of Trade Reports have long declared to be necessary, and as the Indian railway companies have found to be so essential to economic working, as the basis of any intelligent attempt at just and fair regulations for the better management of our railways. And none will benefit more directly by honest and open book-keeping than the railway proprietors.

A GLOWING and fascinating account has lately appeared in the daily papers of what is called "a new discovery in electricity," but which proves to be only a scheme for applying the well-known electrolytic action of the electric current to sewage collected in tanks. The particles of matter suspended in the sewage are, the account states, "set in a circulatory motion by the electric current, a kind of procession taking place from the top downwards, and from the bottom upwards." A phenomenon of this kind is well known to those who have experimented on the introduction of oxygen gas into foul water. "The upward action is due," the account goes on to say, "to the presence of certain gases, at first extricated by the electric current, and afterwards mingling with the organic matter so as to give buoyancy to the latter." If the scum thus formed is stirred up, the gases, which are, or course, oxygen and hydrogen, escape, and the solids precipitate; but it is proposed to run off the floating matter into a separate tank before this precipitation takes place. The projector of this scheme, who also proposes to apply the same process in lieu of the filtration of the drinking-water supplied by the water companies, gives no indication that he is aware of the fact that the water through which it is wished to pass an electric current must be acidulated. Faraday recommends for the purpose one part of sulphuric acid to thirty parts of water. The projector is aware of the decomposition of the electrode, which conveys the current, whether produced by a battery or by a dynamo machine, into the acidulated solution. He considers that it will amount to a grain per gallon, which, roughly speaking, would be equal to the liberation of a quarter of a grain of oxygen per gallon of sewage. Small, however, as this amount is, it would be equal to ten tons per day over the volume of the London sewage. The present price of copper is 1s. 0½d. per pound; but, taking it only at 100*l.* per ton, the cost of this one item would amount to 365,000*l.* a year; so that it is not necessary to go further into detail at present.

A COST of but little more than 200*l.* an hour for extra gas burned during the three days' fog of the 10th, 11th, and 12th instant must be regarded as extremely small, yet this is the outcome of the figures published as to the extra quantities of gas sold by the Gas Light and Coke and the Commercial Gas Companies on those days, as compared with the corresponding days in 1887. The totals, in round figures, were 290 millions of cubic feet in 1887 and 328 millions in 1888, or little over 13 per cent. more, where one might naturally have expected something like a double consumption. These figures, at the price of 2s. 9d. per thousand, show a daily cost of about 15,000*l.* for the light supplied by these two great companies at this time of year; but as to the distribution of that cost per hour of the twenty-four there are no data accessible to us, although it is probable that the hourly flow may be gauged by the gas companies.

THE figures, for what they may be worth, of the census of unemployed in London, taken in December last under the joint auspices of the *Pall Mall Gazette* and a business company alive to the advantage of advertisement, show that 828 carpenters and joiners, 1,023 masons, &c., 1,890 painters, 251 plumbers, 350 engineers, and 7,403 labourers (among 17,711 men of all callings specified) registered themselves as out of employment at the period the census was taken. The totals of the trades named bear about the relative proportions to each other which we might expect, and so far go to show the reality of the census. Whether it was complete or not, or whether the want of employment indicated by it was exceptional for the time of year, we have no evidence before us to show. The returns show the length of time the men were out of work, and their ages, but these are points which we cannot stay to analyse, nor, indeed, do we think it worth while to do so, for, seeing that the registration was for the most part voluntary, the figures given could not be relied upon as an absolute index of the number of the unemployed.

THE City of Chester is fortunate in still possessing an almost perfect environment of its original walls, the Roman character of which was strongly supported by Mr. E. P. L. Brock, F.S.A., in a long paper read last Tuesday before the Chester Archæological Society. The Dean of Chester has extracted from one small pit on the inside of the wall, in the field called "Dean's Field," about a dozen sculptured stones and architectural fragments of much interest, and nearly as many inscribed sepulchral slabs, which add greatly to our somewhat limited *corpus* of Romano-British epigraphy. These are, at present, carefully kept under lock and key in a shed, and are not to be given to the world until the Society has had an opportunity of publishing them. If this is done without delay, there is nothing to be said against it; but it would be unfair, for obvious reasons, to delay for a single day unnecessarily the manifestation of relics fraught with so great an interest to the general body of archæologists. In the free and unrestricted consideration of relics and fragments such as these, archæology as a science alone can hope to live and make sound progress; and the world cares little who may be the temporary custodian or owner of them, provided they are not needlessly kept out of sight nor withdrawn from inspection. At the same time, it is quite proper that those who have gone to some expense to recover them from their hidden recesses should be entitled to decide in what manner the treasures thus brought to light by their means may be best put before students of the subject who are anxious to discuss them. We only plead that this may be done without delay, in order that those who still dally with the evidence of their senses may, at least, see how they are affected by the latest additions to the antiquities of Chester.

THE Cart Navigation Scheme, which, as pointed out at some length in the *Builder* of Sept. 3rd last, is designed to raise a trifling Renfrewshire affluent of the Clyde to the grade of a ship canal, and to confer upon the rising town of Paisley the advantage of uninterrupted sea communication for large vessels, is being prosecuted with commendable diligence. A large measure of the excavation above low-water mark has been accomplished; the new cut to avoid an awkward bend of the old channel is down to the same mark, and the precautionary embankment work on the west bank has been completed, as also the sunken weir between old Paisley harbour and the new harbour now being made. Present activity centres chiefly on this new harbour, which is well forward,—a considerable stretch of the quay wall being finished,—and on the dredgings at the mouth of the Cart where that river joins the Clyde. The Cart mouth will be dredged to its full depth before many weeks are over, and will at once be put to use as a lower or temporary harbour for Paisley, where vessels may discharge into light craft within the town's own waters (although still three miles away) instead of doing so at one or other of the lower Clyde ports,—hitherto the only available method where vessels of size have been concerned. This secures to the Paisley Navigation Conservancy Board quite an early beginning of income against the outlay of the general deepening and widening works, inasmuch as vessels discharging at the temporary harbour pay dues into its treasury instead of into that of a stranger Board farther down the Clyde, while at the same time reducing lighterage costs to a minimum in the interests of the Paisley importer. It is fully a year now since the ground of the Cart works was broken, and during that time from one-third to one-half of the whole has been got through, the remainder consisting chiefly of removals from below low-water mark, to be effected by dredging for the most part. There is every prospect of the enlarged channel being open for laden ocean-going ships up to Paisley by the middle of 1889. Messrs. Miller & Bell, of Glasgow and London, are the engineers, and Messrs. Mitchell & Ireland, of Glasgow, the contractors. Mr. John Kyle, the resident works engineer, it may be mentioned, has been selected by the Manchester Ship Canal Company for the city terminal harbour section of that great work, and leaves the Cart operations to that end at an early date.

ARCHITECTS suffer and will probably continue to suffer much at the hands of competition-promoters, many of whom seem to be under the impression that architects ought to deem it a privilege to be allowed to think-out and prepare at their own cost a plan for whatever building may be in contemplation. That impression is undoubtedly derived from the fact that no matter how degrading or insulting the conditions of a competition, there is always a host of competitors, mostly novices and untried men. It is not often that the *reductio ad absurdum* of a typical competition advertisement is so well made as it is in the following letter sent to *Indian Engineering* by a well-known Bombay architect:—

"Sir,—The advertisement launched forth by the Umritsur Municipality is both instructive and amusing. At first I thought it a hoax, and a stupid one of the Simple Simon type, but I am now convinced that it is intended to be clever. The Municipitality ask for complete 'working drawings, specification, and estimate,' for a hospital to cost 75,000 rupees, and offer a prize of 500 rupees. That is to say, they ask for 2,000 rupees' worth of work, and offer for it the magnificent sum of 500 rupees in the form of a prize! Such unbounded liberality should meet with a hearty response throughout India. Would you mind notifying that the undersigned will be happy to receive any number of dress suits of clothes, valued at eight guineas each, and he will give upwards of two guineas for the suit which fits him the best, and, like the Umritsur Municipality, he will not bind himself to return the rejected suits, as they may be useful to him hereafter? Intending tailors will be furnished with full measurements on application. Now please don't all speak at once. R. F. CHISHOLM.

Bombay, December, 1887."

THE following is the statement made to the Council of the Royal Institute of British Architects by Mr. Francis Hooper, who has been awarded the Godwin Bursary for this year, as to the line of study which he proposes to take:—

"The several gentlemen who have already held the Bursary have furnished you with the results of their investigations into the methods and laws which affect building operations in the United States of America, in Canada, in Germany, and in Austria. It is, therefore, after careful consideration that I propose, should I be honoured with selection, to devote my study to the work of our *confrères* in France.

Subjects for special inquiry group themselves under the following heads:—

1. The powers obtainable by municipal or other authorities for effecting public improvements both in town and country.
2. The principles of local self-government and State-aided works, as an outcome of No. 1.
3. The regulations affecting the erection of national as well as public and private buildings, including theatres, factories, and residences, both with regard to planning and construction.
4. The regulations for the protection and preservation of monuments of national and historical interest, whether buildings, statues, or otherwise, also the incidence of taxation for their maintenance.
5. The State aid given to provincial authorities for the establishment of art galleries and museums.
6. The methods of controlling and supervising the construction of buildings generally, which correspond to the work of our District and Local Board Surveyors as well as Sanitary Inspectors.
7. Law affecting light and air.

Two provincial cities whose building activity has forcibly struck me, namely Nantes and Havre, I would propose to carefully explore, reporting such methods of planning, construction, and fitting as appear likely to be serviceable and suggestive to British architects.

This is an extensive programme, and if ably carried out ought to present us with a valuable body of information as to the manner in which "they manage these matters in France."

MR. HODGSON, in his lecture at the Royal Academy last Monday, succeeded in introducing a refreshing originality into the expression of his views on painting. It is, indeed, a novelty to hear from within the walls of Burlington House, and in the august presence of "Mr. Keeper," a strong expression of doubt respecting the efficacy of the stereotyped academic system of training by which the artistic beginner in the schools is set to work at "the antique" before he is allowed even to think of "the life." Mr. Hodgson sounded a note which is no new one outside the Academy, when he urged that the young beginner is but ill-fitted to understand the subtle beauties of the famous statues, the casts of which he is apt, under the grind of the present system, to grow to positively detest. This view is one which has been thoroughly accepted by our French neighbours, and with most satisfactory results. It is gratifying to find that while at the same time the Professor of Painting at Burlington House has shown a generous acknowledgment of the deficiencies of the stereotyped system,—which, as Mr. Hodgson pointed out, owes its existence to the traditions of the Renaissance worship of the Classic,—the students appreciated the truths of their teacher's views by warm and repeated applause.

A CONTROVERSY of some interest has been taking place in the *Liverpool Daily Post* recently between Mr. J. Boult, an architect and antiquary well known in Liverpool and its neighbourhood, and Mr. Conway, the Roscoe Professor of Art, as to the supposed part taken by Alfred Stevens in the design of the pediment sculpture of St. George's Hall. We have not space for the letters, but the gist of the matter is that Mr. Conway seems to have assumed it as an understood thing that Stevens designed the sculpture (an idea we never heard of before, and certainly the design, taken generally, though respectable enough, is not worthy of him), and Mr. Boult traces the idea only to the fact that Stevens probably drew the lithographed view of the pediment and its sculpture, which was dedicated by Cockerell to the Corporation of Liverpool. Mr. Conway undertook to investigate the matter, and professes himself satisfied, by the testimony of three living friends and pupils of Stevens, that at all events the two end figures of the pediment were both designed and modelled by Stevens, besides making the drawing of the whole before referred to. Mr. Conway has also discovered that Stevens designed the decorations of the Liverpool Philharmonic Hall, and those of a house near Liverpool, and that the drawing for the Philharmonic Hall decorations was purchased for the South Kensington Museum. Mr. Conway proposes to have a small exhibition of drawings and memoranda bearing on the subject in the gallery of the Liverpool Art Club. This would be of more than local interest.

A METHOD of fixing slates or tiles, called "Harvey's patent system," of which a model has been submitted to us, seems well worthy of the attention of those who want first-class work in roofing, and can afford to pay for it: we refer to it with this proviso, because it is an expensive method. The tiles are made with a small raised shield or boss on them at the lower end, through which a screw is passed into the boarding, the screw through the end of the upper tile also clipping the side of the next one and the top of the next, by passing through niches cut in the sides and top of each tile. This is, no doubt, a remarkably secure roof, though it would be a difficult one to lay without great accuracy in the make and finish of the tiles. The raised shield on the upper tile has the effect of throwing the water off the screw-head, but it does not improve the look of the roof. Slates are treated with a screw and a lead washer. There appears also to be another method for the tiles, as we gather from the specimens sent us, of confining the lower end of the tile by a slot of dovetail section, slid over the screw-head, instead of screwing through from the top. In this case the screw-heads would not appear on the surface at all. We have often thought it an absurdity that our usual form of roof-covering should be fastened so as to be continually liable to injury by wind. Mr. Harvey's system will obviate this, and no wind will strip the tiles if the screwing down is properly done; but a thing of this kind cannot, of course, be done without considerably increased labour and cost in fitting.

AT a general meeting of the Royal Academy on the 17th, Mr. W. B. Richmond, painter, Mr. Onslow Ford, sculptor, and Mr. A. W. Blomfield, architect, were elected Associates. All our readers will be glad to congratulate Mr. Blomfield on his election, nor have we anything to say against any of the elections except in the sense of remembering others who might have had a prior claim. Why Mr. A. Hunt, among painters, and Mr. G. A. Lawson, among sculptors, are to be persistently passed over is a puzzle, of which we suppose there is some explanation not apparent on the surface of things.

THE "EDINBURGH REVIEW" ON RUSKIN.

THE new number of the *Edinburgh Review* includes a sharp attack on the position of Mr. Ruskin as a teacher and critic on art, apropos of the republication of his principal works, which is in progress. We extract the portion of the article referring to architecture:—

"The 'Stones of Venice,' which, as we observed, has reappeared recently in a sumptuous edition, is the most important demonstration which Mr. Ruskin has made in reference to the art of architecture, upon which he has undoubtedly some striking and rational ideas, more perhaps than in regard to any other form of art. His other deliverances on this subject are to be found in the 'Seven Lamps,' in 'Lectures on Architecture and Painting,' and in the lecture to the Architectural Association included in the volume entitled 'Two Paths.' The 'Seven Lamps,' crammed as it is with elaborate nonsense and disfigured by detestable illustrations which any man with a feeling for architecture ought to have been ashamed of, may be regarded as pretty well *passé* now. Few are likely at present to be carried away by such phrases as 'the foul torrent of the Renaissance,' or to take a series of picturesquely expressed musings upon a certain arbitrarily adopted view of architectural truth as a series of infallible dogmas. No less than this, however, was the intent and claim of the author, who says that he 'had long felt convinced of the necessity, in order to its progress, of some decisive effort to extricate from the confused masses of partial traditions and dogmata, with which it has become encumbered during imperfect or restricted practice, those large principles of right which are applicable to every stage or style of it.' That such an effort was required is very true; but Mr. Ruskin's method was too narrow in its sympathy and too vague in its dogmatising to render any decisive service to the art, and his pretended analysis only amounts to a complicated rhapsody in favour of certain foregone conclusions, accompanied, as in his treatise on mountains, by a false pretence of scientific knowledge in order to give a factitious air of authority to his statements. The entire absence of the logical faculty does not promise much for an author's power of dealing with so essentially logical an art as architecture; and we find that while recognising architecture as an art 'uniting technical and imaginative efforts as humanity unites soul and body,' he nevertheless can bring himself to say that 'while we cannot call those laws architectural which determine the height of a breastwork or the position of a bastion,' yet 'if to the stone facing of the bastion be added any unnecessary feature such as a cable moulding, that is architecture.' A more shallow and trumpery definition of this great intellectual form of art was never uttered; it is so inherently false and superficial as in itself to vitiate all claim of its author to be a critical teacher on architecture. All the interest and effectiveness of plan and construction is at one stroke reduced to nothingness, and architecture made to depend merely on some ornamental adjuncts. It is impossible that Mr. Ruskin can really believe this, though he repeats it more than once in the 'Stones of Venice' in different words, because he indulges in other reflections on architecture which are completely at variance with it. The 'Stones of Venice,' however, is in its general scope a somewhat more reasonable and logical work; and it contrasts favourably with the 'Seven Lamps' in one respect at any rate, that it is furnished with a number of superb illustrations,—many of which are genuine illustrations of architectural detail shown in a technical and workman-like manner, not mere picturesque scrawls to catch the eye of schoolgirls. But a little closer inspection will show that the serpent of rhetorical exaggeration has drawn as noxious a trail over this as over most of the author's other works. The main object of the book is defined to be an attack on Renaissance architecture: 'it is in Venice only that effectual blows can be struck at this pestilent art of the Renaissance; destroy its claims to admiration there, and it can assert them nowhere else'; and the reader is invited to a consideration of the glories and truth of Venetian Gothic, and the vileness of Venetian Renaissance. Now the intended argument fails in its very initial position. The reason given for attacking Renaissance architecture in Venice is that this was its birthplace, which is certainly no more true of Venice than of Florence or Rome, at all events. Then the selection of Venetian Gothic as an opposition to Renaissance is a lapse, since the Gothic of Venice is deficient in many of the most characteristic qualities of the great Gothic style. The author describes the characteristics of northern Gothic in a passage of most picturesque eloquence, some phrases in which have become almost proverbial. But it is exactly this rough 'wolfish' character, the true antithesis of the highly-polished and finished Renaissance, which is not present in Venetian work. Venetian Gothic is a remarkably charming, piquant, poetical phase of the style, tinctured by Oriental fancy, but it is a decidedly weak and faulty form of Gothic architecture: it is destitute of the great qualities, of the logical artistic and constructional consistency, of the true Gothic style. The fact seems to be that Mr. Ruskin was much taken with Venice; that it was in his young days a rather unworked vein; and just as one of the knights in Malory's 'King Arthur' turns into some courtyard where he had no business, because 'him seemed it were a good place to fight,' so Mr. Ruskin turns on Venice to batten on its remains (as Balzac said of Byron), because it was a good place to orate about. The weapons of rhetoric are duly furbished up for the fray, and we soon find him at his old tricks again. The illustration supposed to represent the Venetian and English 'types' of towers, in which a very large campanile, effectively shaded and with a mass of cloud behind it, is shown on the same page with a very bad illustration of one of the smallest and meanest examples of an English

tower that could be picked out, is repeated in its old form in the new edition of 'The Stones.'

The unscientific construction of the arch in much Venetian work, with only two or three long pieces jointed together, instead of genuine voussoirs, is shown and illustrated as if it were a special feature for admiration, instead of being, as it really is, a clumsy method of construction, neither arch nor anything else. It is probably because Mr. Ruskin is dimly conscious that this objection of bad arch construction may be brought against his beloved Venetians that he sets up the extraordinary theory that the pointed arch is in reality and essentially 'a gable construction,' a lean-to of two lintels, the arched form being merely a minor device to strengthen the back of the gable against the weight of the superstructure. A writer who could say such a thing would appear to be totally blind to the whole constructive and architectural characteristics of arcuated architecture, unless we are to accept the alternative supposition that Mr. Ruskin is merely making out a case for Venetian architecture, and is under the necessity of inventing a theory to defend their weak and unscientific form of building.

In the same spirit he lays hold of the peculiarly Venetian method of treating the extrados of the arch, making the voussoirs deeper towards the apex of the arch, and calls upon his hearers to admire that as the only true method of building an arch to resist weight at the apex. This is simply ignorant nonsense, as any real knowledge of the statics of the arch would have told him. Except in a pointed arch of very narrow proportions, or unless the thickening of the voussoirs towards the top were carried to a very abnormal extreme (which is practically the same thing), an arch weighted at the apex would fail by the rising of the haunches, and the thickening of the voussoirs towards the crown would avail nothing to save it; and when the arch is built up solid above the extrados, the principal load is after all over the haunches, and *not* over the crown, in Venice as well as everywhere else.*

But after all this special pleading and inversion of scientific fact in order to make a case for Venetian Gothic *versus* Renaissance, we find that, when we come to deal with the Renaissance, the pith of the argument against it is entirely lost sight of, and the author cannot even lay hold of and use the weapons which are ready to his hand. For the real architectural weakness of the Renaissance or Palladian architecture, compared with Greek and Gothic architecture (both of which latter are equally true in their æsthetic and constructive expression), is that the architectural features are only a piece of scenery planted on irrespective of the real construction of the building; that it constitutes a false application of the materials of Classic architecture. Mr. Ruskin might have made a case against Renaissance architecture on the most plain and logical system of reasoning; but he prefers rhetoric to reasoning, and accordingly merely goes off into rhapsodical declamation about the 'pride' of Renaissance architecture, its 'want of concession to the simplicities of humanity,' &c.; all which to a certain extent is true; but as a moral charge against a special form of art, it is a kind of charge which might with equal force be brought against the works of Titian, his favourite painter, who certainly never painted for the 'masses.' It is true that there is something of the exclusiveness of aristocracy about Renaissance architecture; it is true that it is an architecture which very much recommended itself to persons who could afford to build palaces, and that it is not an architecture for the poor man's home; being derived as it is directly from the remains of the largest and most sumptuous Roman buildings, the temples, it has a kind of hereditary character of sumptuousness in all its details. It is, no doubt, essentially a palatial form of architecture; it is the architecture of aristocratic refinement; but 'whether it be damned for that we know not.' What is called aristocratic refinement is after all one phase or form of human social development, and we are quite unable to see that it is the worst one. Let us for a moment suppose the whole of Renaissance architecture and its production struck out of existence, and imagine what a monstrous cantle would be cut out of our province of architectural enjoyment. The weakness of Renaissance architecture lay partly, no doubt, in its system of scholastic rules, which fettered the originality and fancy of the Renaissance architects, and rendered them translators and adapters rather than authors. So far true: it was cold and emotionless,—qualities which it has in common, however, with the perfect architecture of Greece; but its main and true defect, as architecture, was in its application of external features irrespective of internal design and construction: the application of 'the order' irrespective of stories. But the logical author has nothing to say to this essentially illogical character of the Renaissance type of architecture: he inveighs against it only in an endless string of rambling rhapsody, into which all kinds of apparently irrelevant subjects are dragged in, from the painting of Millais's 'Huguenots' to the beautiful old story of the illustration of human life by the idea of a bird flying through the house, in at one door and out at another; which, says the writer,—

'could not have happened in a Renaissance building. The bird could not have dashed in from the cold into the heat, and from the heat back again into the storm. It would have had to come up a flight of marble stairs, and through seven or eight ante-chambers; and so, if it ever made its way into the presence-chamber, out again through loggias and corridors innumerable.'

In other words, civilisation has led, among other improvements, to the building of mansions comfortable as well as stately. Does Mr. Ruskin live in a single bare hall, with doors wide open in winter? It would be waste of words to criticise such puerile nonsense at the outset; that any man should deliberately reprint it at the end of a lifetime is too pitiable.

The popular disquisition on the meaning and essence of architectural design, which occupies a considerable portion of the first volume of the re-issue of the 'Stones of Venice,' has undoubted merits as a 'way of putting things,' a manner of placing the truth of the matter in the simplest words, without any reference to mere technical phraseology. Some parts of this are so well done that it is vexatious to find them mixed up with misleading and contradictory views arising from faulty scientific knowledge (one might say, from the writer's essentially unscientific frame of mind), and from the eternal desire for making points that has more than anything else vitiated the whole body of Mr. Ruskin's literary work. The suggestion that there are really only two 'orders': those in which the bell of the capital is concave in section and the decoration in relief, and those in which the bell is convex and the decoration cut into it, is a really brilliant generalisation, though, of course, it has nothing on earth to do with the real meaning of the word 'order' as used in architecture. Like most of the author's generalisations, however, it is not the whole truth; the definition can hardly cover the type of capital of which the Ionic is the leading form; and that type is not going to be pushed aside: it has shown evident signs of the contrary. About the pointed arch Mr. Ruskin is hopelessly at fault in every way. He attaches a constructive value to the Venetian form of it which exists only in his own imagination; while on the other hand he entirely ignores the constructive origin of the pointed arch in the great styles of Gothic. 'The Greeks gave the shaft, Rome the arch; the Arabs pointed and foliated the arch.' That is a neat sentence, and has the advantage of connecting the pointed arch with the Venetians, who, no doubt, got their unscientifically constructed arches from Oriental sources. But does not Mr. Ruskin know that the large arches of Furness and Fountains and Kirkstall were pointed, for constructive reasons (while the smaller ones still remained round), by builders who had never heard of the Arabs, and to whom the East was an unattainable Ultima Thule? Every architect knows that now; but, of course, Mr. Ruskin cannot learn from people so ignorant of architecture as architects.

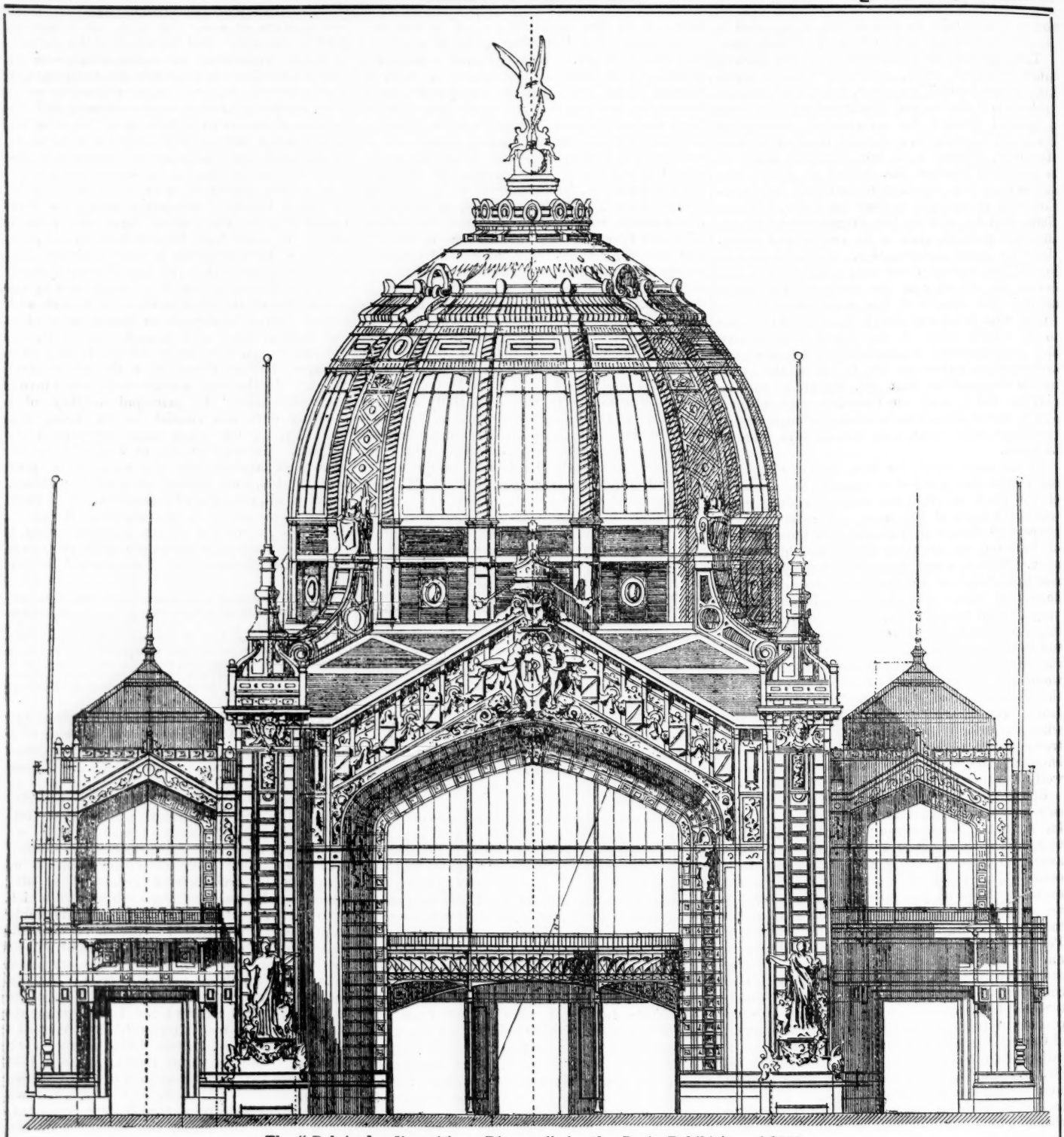
His Venetian proclivities have led him astray again about keystones: in the true Gothic arch the keystone is not; the arch has a vertical joint at the apex. But the whole of the author's so-called reasoning on architecture,—as on everything else,—is a jumble of sensational and contradictory rhetoric, more especially so in what relates to architectural ornament, and the relation of nature to architecture. Some of the most shallow talk on this subject is to be found in the Edinburgh 'Lectures on Architecture and Painting,' in the course of which the pointed form of the leaves of a tree was adduced as having a beauty 'altogether owing to their terminating in the Gothic form, the pointed arch.' It would have been difficult to compress into one short sentence a more hopeless confusion of illogical thought and illogical illustration, the fatuity of which is heightened by the production of the illustration of a branch with square leaves 'designed on Greek principles.' The lecturer knew well enough that the Greeks did not design decorative foliage in any such manner; but anything for a bit of claptrap effect.* In the same lecture is the mischievous statement that 'the principal nobility of a building does not consist in its being well built, but in its being nobly sculptured and painted.' In the 'Stones of Venice' 'the two virtues of architecture are strength or good construction, and beauty or good decoration.' So, after all, strength of construction is to come in for some share in the matter. Beauty of decoration, according to the passage above, is 'noble sculpture and painting'; and true enough we have a rhapsody in 'Two Paths' to that effect:—

'Nobody ever used conventional art to decorate with when he could do anything better. . . . . Correggio gets a commission to paint a room in the ground-floor of a palace at Parma. Any of our people, bred on our fine modern principles, would have covered it with a diaper, or with stripes, or flourishes, or mosaic patterns. Not so Correggio: he paints a thick trellis of vine-leaves, with oval openings, and lovely children leaping through them into the room.'

Yes, and the man who decorated 'Burleigh House by Stamford town' painted a side of a room as a colonnade with a landscape seen beyond, and figures flying into the room between the columns. He did not do it as well as Correggio would have done, but the vulgarity of the idea is about the same in each case. But in the 'Stones of Venice' (vol. i., p. 231) we read, under the head 'Treatment of Ornament,' that 'no perfect piece of either painting or sculpture is *architectural ornament at all*.' Then what becomes of the architecture which is to be great 'only in so far as it is nobly painted and sculptured'? Elsewhere we read that 'our first constituents of ornament will be abstract lines; as soon as it is a resemblance it is bad,' which is perfectly true; and in another passage of the 'Stones of Venice' he interdicts (quite rightly) the floral ornaments in St. Paul's as not 'ornament,' but only like 'so many Van Huysums hung above each window.' But in 'Two Paths' we are told that 'mere lines and mouldings can do nothing for our artistic salvation, and that what we have to do is to copy nature in our ornament, the flight of the eagle, the swiftness of the hare'; and when we are tired of them, 'if we wander down to the beach, there is not a piece of torn cable that will not twine into a perfect moulding, nor a fragment of cast-away matting or shattered basketwork that will not work into a chequer or capital.' But in chapter xx. of the 'Stones of Venice' we find that ignoble ornament is that composed of 'the imitation of things made by man' (including, we presume, 'cables' and 'old baskets'). Then in another mood we are offered branches and other natural objects (plate vii. in same volume) as suggestions of curves for ornament,—quite illogical, in the first place, as abstract curves have no reference to physical nature, but only to geometrical proportion; and, again, this is conventionalising nature, and we are told in 'Two Paths' that no man would ever use conventional ornament when he could get natural forms. But in spite of this our admiration is invited for a conventional treatment of the peacock on a Venetian palace (plate viii.), with an indication of eyes in the tail done by the clumsiest device of raised rings carved in relief on the stone,—a more coarse and commonplace piece of conventionalism could hardly be found; yet when the Greek does the very same thing in a masterly way with the so-called honeysuckle ornament, it being Mr. Ruskin's cue at this time to run down the Greeks, this is 'a starched and dull sugges-

* We can hardly convey a better idea of the childishness of the author's pretended analysis of arch construction than by quoting this passage word for word:—'Let Plate III be the shell of a pointed arch with loose loading above; and suppose you find your shell not quite thick enough, and that the weight bears too heavily on the top of the arch, and is likely to break it in, you proceed to thicken your shell; but need you thicken it all equally? Not so; you would only waste your good voussoirs. If you have any common sense you will thicken it at the top, where a mylodon's skull is thickened for the same purpose (and some human skulls, I fancy). The pebbles and granite above will now shoot off it right and left, as the bullets do off a cuirassier's breastplate, and will have no chance of beating it in.' ('Stones of Venice,' vol. i., p. 128. Fourth edition.)

* These lectures have not yet been republished, but the well-handled state of the copy in the British Museum shows that this nonsense still finds a number of readers.



The "Palais des Expositions Diverses," for the Paris Exhibition of 1889.

tion of vegetable form, and yet no real resemblance or life, for the conditions of them result from his (the Greek's) own conceit of himself and ignorance of physical laws.' In short, on this most interesting and important subject, the relation of ornament to nature, Mr. Ruskin has absolutely no opinion whatever, and asserts one thing at one time and its direct contrary at another, in sheer intellectual dishonesty, indifferent to everything except making a smart hit at the moment."

PARIS EXHIBITION OF 1889.

THE "PALAIS DES EXPOSITIONS DIVERSES."

WE give an illustration of the façade and dome of this pavilion of the future Exhibition, which is being erected on the axis of the Champ de Mars, opposite the Pont de Jena, so as to be seen through the vista under the arched supports of the Eiffel tower. It is being constructed from the plans and under the direction of M. Bouvard, architect. M. Ulysse Gravigny, the architect of the Mairie of Arcueil-Cachan (of which we gave an illustration not long since) is in co-operation with M. Bouvard as his principal assistant in the work.

The sculpture groups in front of the pylons on each side of the entrance represent "Agriculture" and "Industrie"; and the heads on the cornices of these pylons represent "Europe" and "America." The gable is crowned with a sculptural group representing the ship which is the emblem of the City of Paris, over a shield supported by two genii. To right and left will be disposed escutcheons with the arms of the various towns of France, united by ornamental devices between them. This decoration will all be enlivened by colour in enamel and inlaid stones or marbles.

The three doorways of the entrance lead into a large vestibule with four groups of coupled pillars, supporting the galleries and the dome; coloured decoration will be applied here as in the exterior of the pediment; and the vestibule will be further adorned by paintings and statues.

The dome is constructed with sixteen ribs, of which eight rest on the main piers, and the intermediate ones on the circular framing constituting the drum of the dome, the apex of which is surmounted by a group representing "Fame" distributing rewards. The large buttresses seen one on each side give additional support to the dome, abutting on the beforementioned pylons on either side of the entrance.

To right and left of this central erection will be lower pavilions with a ground story and galleries. The strains for all the various portions of this large piece of iron construction have been very carefully calculated.

The work, of which the ironwork alone will cost nearly 400,000 francs, is expected to be completed in August of the present year.

THE TEMPERATURE AND VENTILATION OF THEATRES.

To those who have made the temperature and ventilation of theatres under the varying conditions of gas-light and the electric light their special study, the investigations carried on by Professor A. Dobroslawin, of St. Petersburg, and which have recently been published, will be of special interest. The Professor was induced by the experiments made by Professor Pettenkofer and Dr. Renk in two theatres at Munich to repeat them at St. Petersburg. In the month of February of last year, during the three days of the Carnival, he measured the temperature, the carbonic acid contents, and the relative moisture, in three theatres of St. Petersburg. He was assisted in the work by Dr. Kowolkowsky and Dr. Bosaroff. The three

theatres selected for observation were the Maria Theatre (electrically lighted) and the Grand and Alexander Theatres (gas-lighted). The Maria and Grand Theatres are the most spacious of St. Petersburg playhouses, and constructed to seat over 1,600 spectators each. During the Carnival week performances are held in the three theatres twice every day, morning and evening, and the houses are always crowded. During the observations the thermometers were placed so as to be on a level with the public. The presence of carbonic acid was determined by Pettenkofer's method. Unfortunately, experiments could not be made in the same theatre with different descriptions of lighting; but the difference between the two theatres with different modes of illumination was great enough to show that the results obtained did not depend upon local conditions.

As regards the temperature with the electric light, the latter rose in the pit of the Maria Theatre from the beginning of the performance only from 17·25° C. to 21·50° C., or 4° C., whilst in the gallery and the balconies it rose from 19° C. to 25° C., and from 18° C. to 24° C. respectively, or 6° C. During the intervals the fall of the temperature in the higher places was not so pronounced as in the pit, where the difference amounted in a short time to 2·25° C. In the Grand Theatre, lighted by gas, the temperature rose to such an extent that in the gallery, for instance, the initial temperature exceeded the highest observed in the Maria Theatre (electric light) by 4° C. The difference of temperature at the commencement and close of the performance was 3·5° C. in the pit, 8·25° C. in the balconies, and 3·5° C. in the gallery. At one part of the gallery the thermometer rose to 33° C. Such temperatures were the cause of a sudden fall of the thermometer at each interval, amounting frequently to 2·5° C. in a few minutes. If the two theatres are compared under nearly similar conditions, it is found that the highest temperature with the electric light was 25° C., and with gas 33° C., a difference of 8° C. It is consequently evident that the spectators in the pit, with such sudden changes of temperature, if they are susceptible to colds, may contract an illness much more easily than those in the more elevated places.

As regards ventilation, the observations made appear to demonstrate the fact that the mode of illumination scarcely affects it. At least, the figures of carbonic acid contents of the air in the two theatres differ very little.

Illustrations.

MONUMENT TO THE LATE BISHOP DUPANLOUP.

THIS recumbent portrait figure, executed by M. Chapu, forms the centre portion of a monumental group in memory of Monseigneur Dupanloup, which was exhibited in the *Salon* of 1887, and intended for ultimate position in Orleans Cathedral. The complete monument includes two flanking figures representing "Faith" and "Courage," by the same eminent sculptor. The last-named figure was illustrated in the *Builder* for July 9, 1887, when we gave an account of the sculpture at the *Salon*.

The recumbent figure is said to be a very good likeness, and is a fine specimen of monumental work of this class.

FIGURES FROM THE PEDIMENT, HARRIS FREE LIBRARY, PRESTON.

WE have before referred to the work in this pediment, which is a very satisfactory example of the results of employing a sculptor properly so called, and not a mere "carver," in the sculptural decoration of a building.

WE gave a year ago (see *Builder*, Jan. 15, 1887) illustrations of some of the figures towards the end portion of the pediment; we now give the centre group, representing Pericles as the central figure, with Anaxagoras and Ictinus on one side, and Pindar and Pheidias on the other.

DETAILS OF GRILLE ST. OUEN, ROUEN.

WE give some details of this fine piece of Renaissance ironwork, of which a general view was published in the *Builder* for Nov. 26 last. Detail drawings having been since offered us for publication, we have thought it would be of interest to add these as a further illustration of the work.

BENTHAM CHURCH, NEAR GLOUCESTER.

THIS church, which we illustrate this week, is about to be erected in Gloucestershire, from designs prepared by Mr. S. Gambier Parry, at a cost of about 2,500*l*.

IDDESLEIGH MANSIONS.

THESE mansions, which are being built from the designs of Mr. R. J. Worley, are arranged to form four complete suites of chambers, each suite forming a perfect house on a flat with an external entrance door opening on to wide galleries outside; the galleries taking as it were the place of the street pavement, but in an elevated position.

One special feature in these mansions is that the staircase and hydraulic lift are both outside the building, and that the chambers are approached therefrom by spacious galleries also outside the building, which are fireproof. These galleries are paved with combined ornamental tiles and prismatic light paving so that they shall not interfere with the light coming into the living-rooms.

The great advantage of this arrangement is that in case of fire in any one of the suites the occupants could go outside the building on to the galleries, staircase, and lift.

Each suite has a back tradesman's entrance leading direct into the street, which is also cut off from the main building. Each tradesman's entrance is also provided with a separate service lift so that coals or any other purchases occupants might make could be sent up to the various suites.

Each suite is absolutely fireproof and cut off from any other suite.

The building has a carriage-drive from Caxton-street into the quadrangle to the staircase and lift. This quadrangle will have an ornamental fountain, by Doulton, in the centre, round which there will be a carriage-drive, and the rest will be laid out with turf and beds for flowers.

All the reception-rooms face this quadrangle, and a view is obtained from the quadrangle across the grounds of Christ Church, which are laid out in an ornamental manner.

The elevations are of red brick and Portland stone, the portion from the ground to the first-floor cornice being faced wholly with Portland stone.

The builders are Messrs. Laurance & Sons.

DESIGN FOR A LONDON STREET FRONT.

THIS design, by Mr. W. Leck, received the Upper School Architectural Prize at the Royal Academy last year. We commented on it in mentioning the students' drawings generally the week they were exhibited.

A STREET IN CAUDEBEC.

CAUDEBEC is finely situated on the Seine, between Rouen and Havre. The principal building is the church, of the fifteenth and sixteenth centuries, part of the east end of which is shown in the view. It has aisles, but no transepts. In the Lady-chapel, at the east end of the choir, is the groined roof, springing from a very long stone pendant in the centre, illustrated fully in Pugin and Le Keux's "Normandy." The west front has three highly-ornamented portals, which have done good service in many a picture. The tower, placed on the south side of the church is surmounted by a noteworthy stone spire, with much open tracery: this was begun in 1426; it has recently been restored. There are old timber houses of admirable design, many very picturesquely placed, and the town, water, woods, and hills make pretty pictures from all points.

The British Equitable Assurance Company's New Offices.—The British Equitable Assurance Company have placed the constructional ironwork and fireproof floors required in the new buildings about to be erected for them in Queen-street-place, E.C., in the hands of Mr. Archibald D.Dawnay, A-.M.Inst.C.E., for immediate preparation, so as to avoid any possibility of delay when the builders get to work. Mr. A. S. Gover, A.R.I.B.A., is the architect. The foundations and walls up to the street level have been carried out by Mr. J. T. Chappell, and the superstructure has just been let to Messrs. Higgs & Hill, contractors. Mr. King is the clerk of works.

EXAMPLES OF WROUGHT AND HAMMERED IRON.

THERE would seem to be three *motifs* in hammered iron,—the scroll, the twist, and the leaf. In fig. 1, in the examples given on next page, we have numerous instances of the scroll, ending with a leaf or flower, made by simply hammering the end of the rod flat and shaping it. In fig. 2 we have a grating formed of simple scrolls banded together, taken from a piece of seventeenth-century Venetian work. Fig. 3 again gives us further instances of the scroll, terminating with the flattened-out leaves which, unlike those in the hinge, which is flat throughout, have themselves been bent and curved.

Fig. 4,—Italian work of the seventeenth century,—shows us the scroll with the "leaf." This leaf is not produced by flattening the end of the rod or bar of iron, but is made of a separate piece of iron, which is beaten out and shaped and then forged on to the rod or bar, as though it grew out of the rod or bar. In fig. 5 another variety of this "leaf" is seen. The whole work is a beautiful piece of workmanship and design. The candle-holder itself is, as will be seen, contrived of four "leaves."

The candle-holder, fig. 6, shows us a still more elaborate form of leaf. The possibility of bending iron into the most fanciful and intricate shapes is one of its peculiar beauties, and is well exemplified in the graceful leaves that grow out of and wrap around the main stem.

The grille, fig. 7, is a fine example of workmanship and design, and contains many typical features. We note first of all that the whole space is divided up by means of the scroll bars, which show us how the straight bar can be made to deviate into the circle and scroll, and then return to the straight. Two of the spaces are filled with a kind of open bracket-work, and the rest of the spaces are occupied with the "leaves" springing from the bars.*

The last example we give, fig. 8, is a portion of a piece of English work in the collection at South Kensington Museum, and is dated 1700. The design is bold and masterly, and the way the leaves, which in themselves are very beautiful, play about the scroll bars is at once striking and beautiful.

In none of the examples figured does the "spiral" occur, and yet it is a favourite terminal in most modern as well as old work.

We may add here a note as to the collection of wrought-iron in South Kensington Museum. In addition to Huntingdon Shaw's gates there is in the gallery of the Museum a small but choice and representative collection of work eminently suitable for the purposes of study and comparison. English work, unfortunately, is not well represented. There is a screen from St. John's Church, Frome, among other specimens. The Italian work of the sixteenth and seventeenth centuries is fine, as also the German work of the same periods. There are also a few specimens of French and Flemish work.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AWARD OF MEDALS AND PRIZES.

AT a special general meeting of the Institute of Architects, held on Monday evening last, the following awards were announced, viz.:—

Pugin Travelling Studentship.—Awarded to R. W. Paul. Medal of Merit to E. H. Sedding. Certificate of Honour to C. E. Mallows and A. B. Mitchell.

Godwin Bursary.—Awarded to Francis Hooper.

Tite Prize.—Awarded to G. Kenyon. Medals of Merit to J. Keppie, F. E. Masey, and J. J. Pearson.

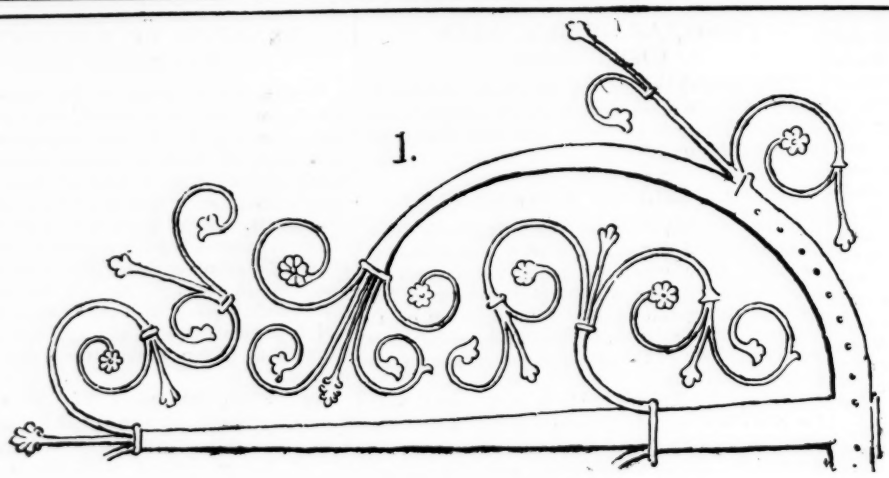
Grissell Gold Medal.—Awarded to J. A. Marshall. Certificate of Honour to J. M. Brooks.

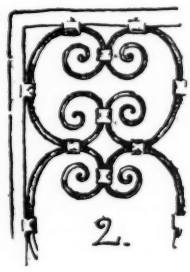
Soane Medallion.—Awarded to A. N. Prentice. Medal of Merit to F. Bellis. Certificate of Honour to F. W. Troup.

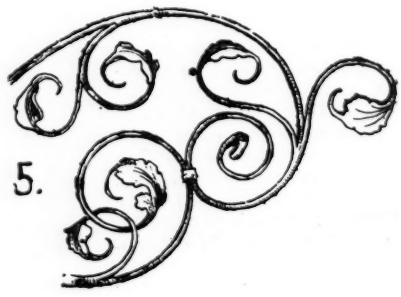
Institute Silver Medal (Drawings).—Awarded to H. P. Adams. Medal of Merit and £5. 5s. to T. R. Kitsell. Medal of Merit to A. A. Cox.

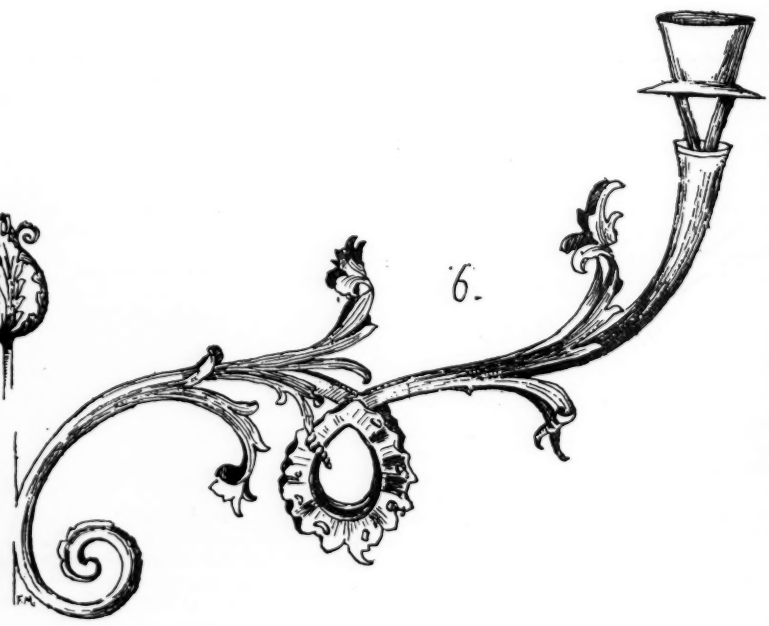
Institute Silver Medal (Essays).—Awarded to "Sursum corda." Medals of Merit to "In this conquer" and "Koln."

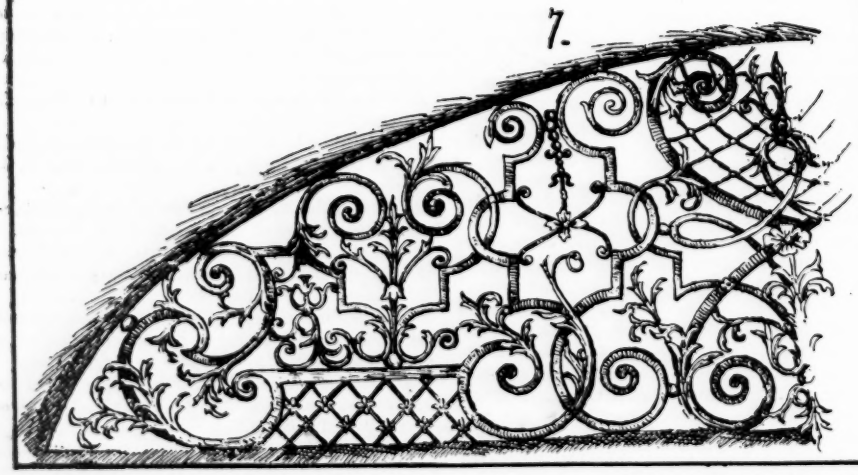
* Figs. 5, 6, and 7 were exhibited by Messrs. Feetham & Son at the Inventions Exhibition, South Kensington, in 1885.

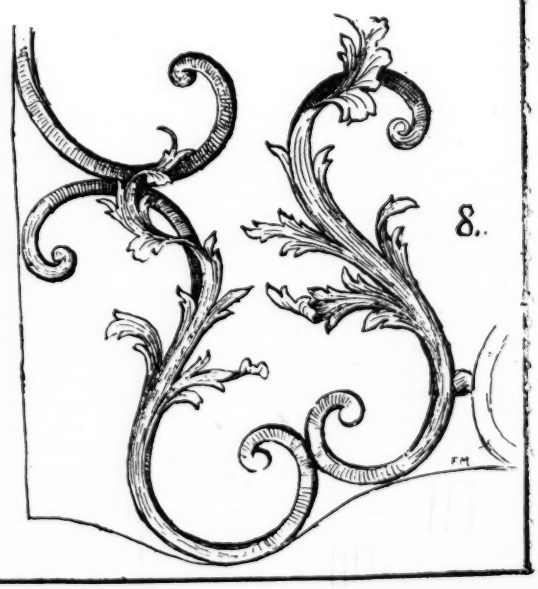












"*Examples of Wrought and Hammered Iron.*"

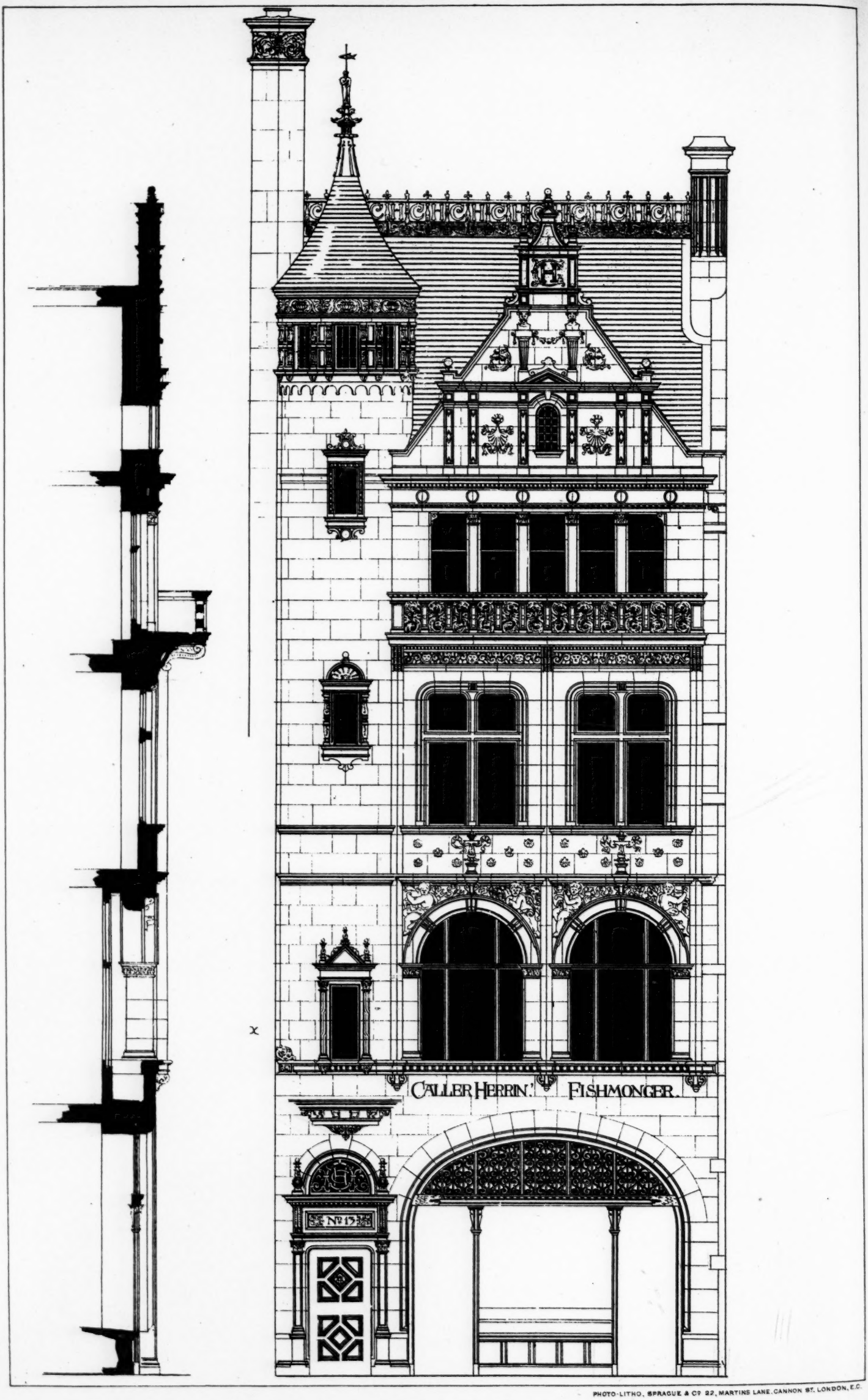
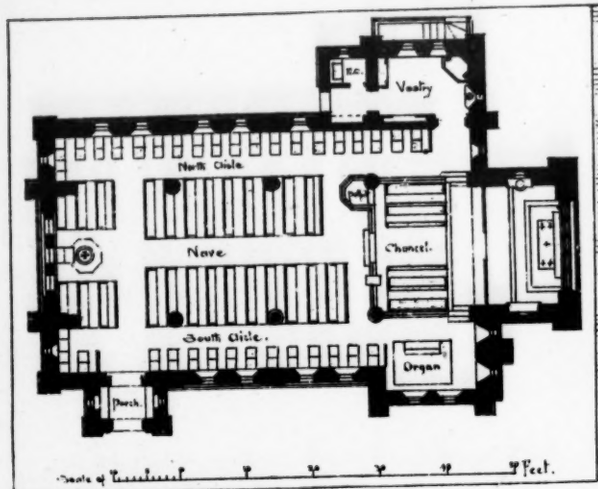


PHOTO-LITHO, SPRAGUE & Co 22, MARTINS LANE, CANNON ST, LONDON, E.C.

DESIGN FOR A LONDON STREET FRONT.—By Mr. W. Leck.

Royal Academy, Upper School Prize, 1887.



BENTHAM CHURCH, NEAR GLOUCESTER.—Mr. S. Gambier Parry, Architect.

Frieze in Screen.

Lower panel in Screen.

Enlarged detail of A.

Style of finish of most of the scrolls.

Frieze above Gate.

Small panel in Screen.

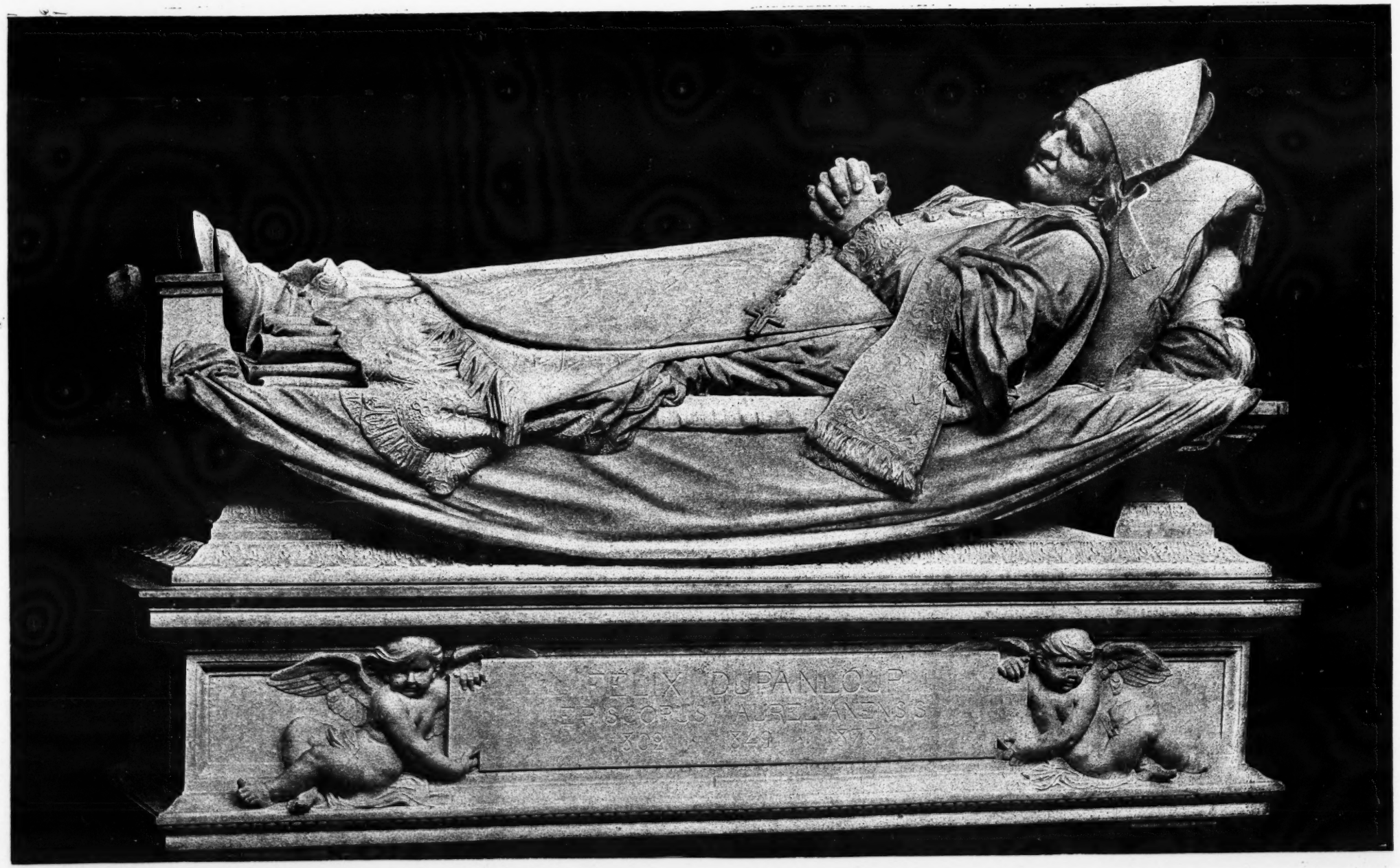
Enlarged detail of B.

Small panel in Gate.

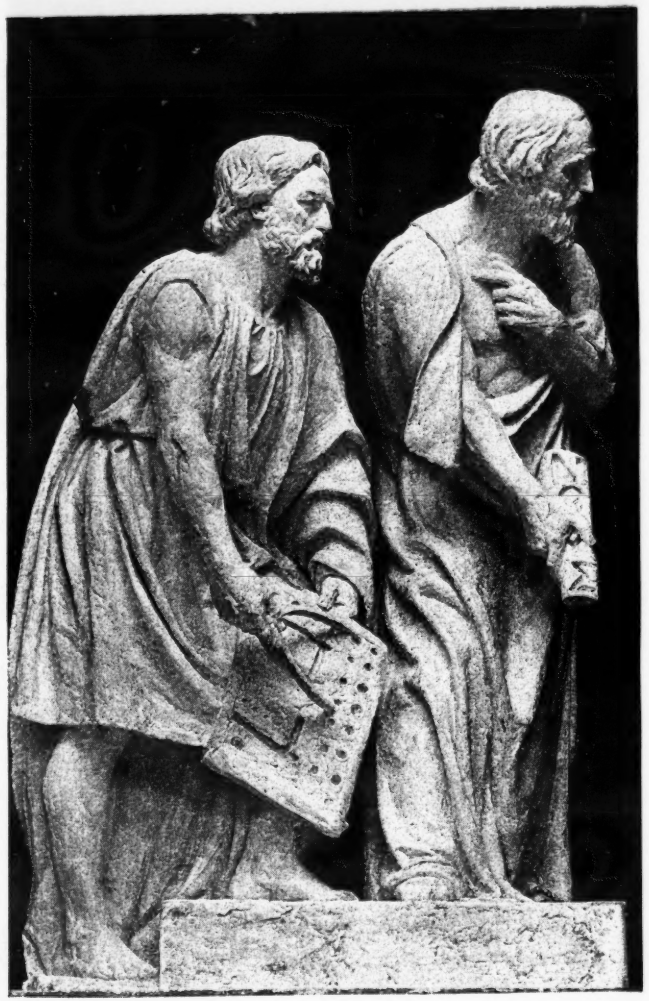
Gate Pilaster & Entablature.

PHOTO-LITHO. SPRAGUE & CO., 163, MARTINS LANE, CANNON ST. LONDON, E.C.

DETAILS OF WROUGHT IRON SCREEN, ST. OUEN, ROUEN.

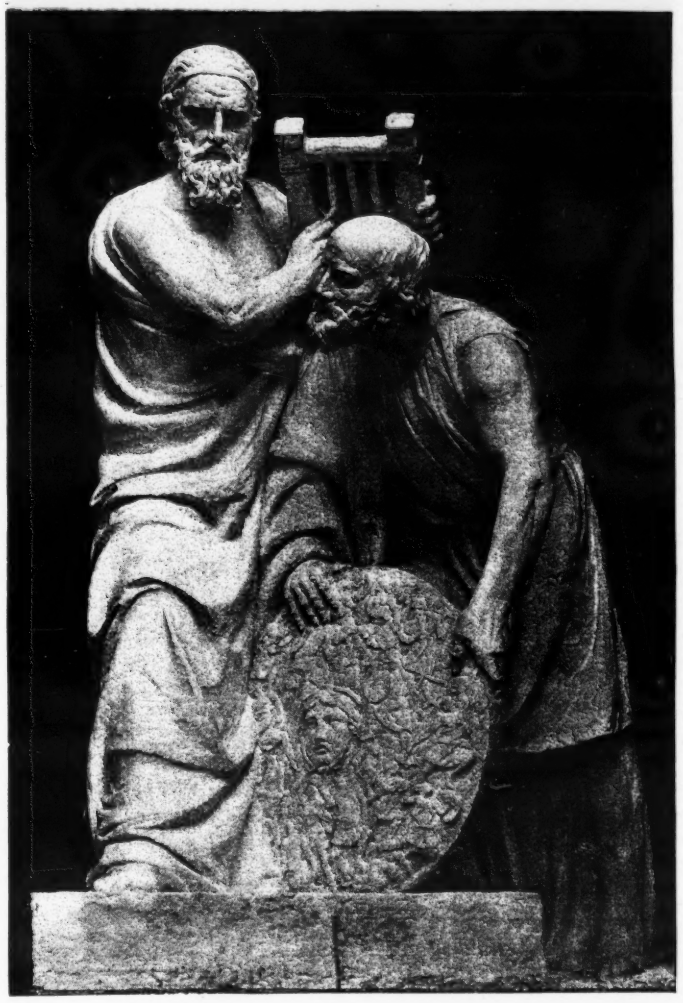


MONUMENT TO THE LATE BISHOP DUPANLOUP. M. CHAPU, SCULPTOR.



ICTINUS. ANAXAGORAS.

PERICLES.



PINDAR PHEIDIAS.

FIGURES FROM THE PEDIMENT, HARRIS FREE LIBRARY, PRESTON. MR. E. ROSCOE MULLINS, SCULPTOR.

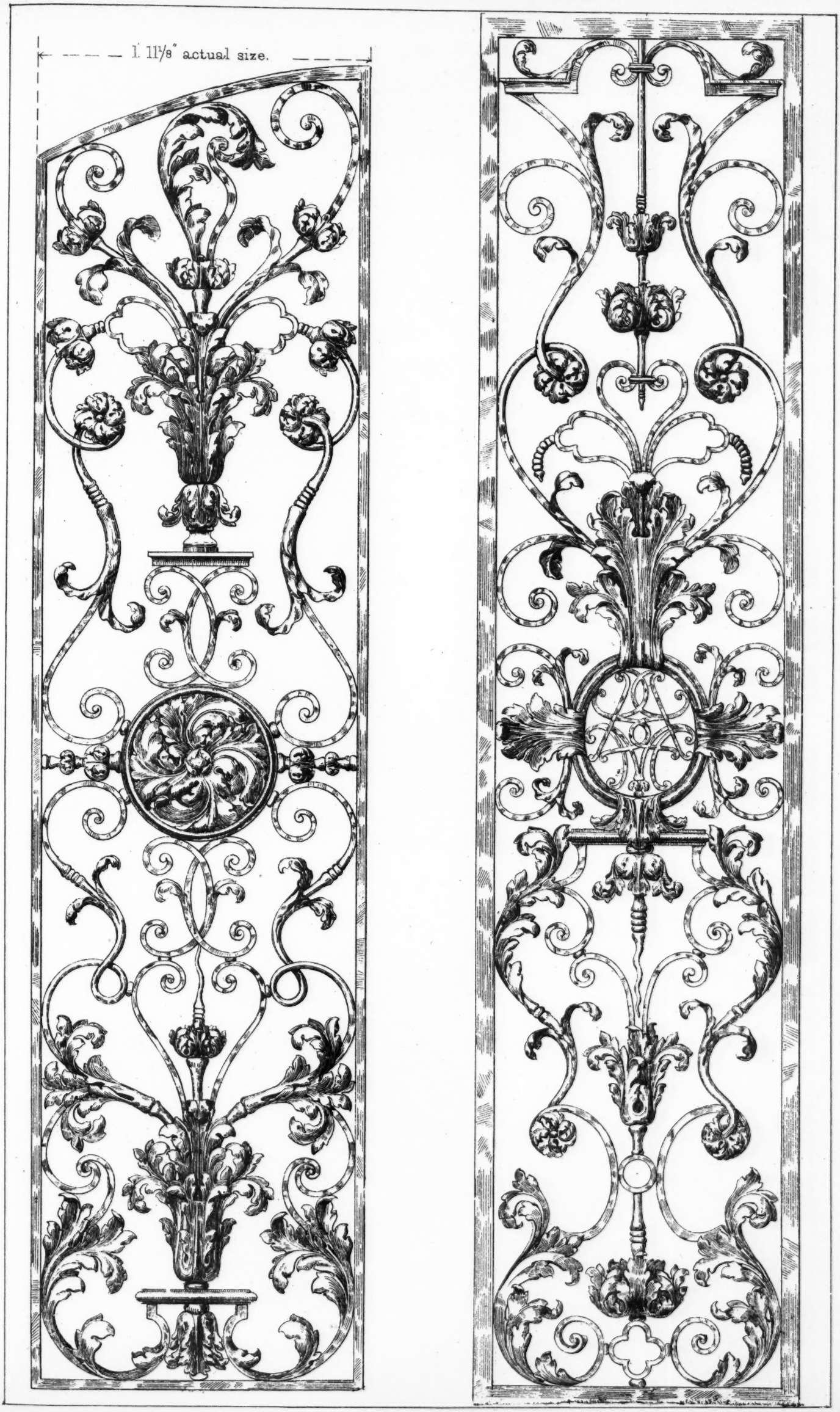


PHOTO-LITHO. SPRAGUE & Co 22, MARTINS LANE, CANNON ST, LONDON, E.C.

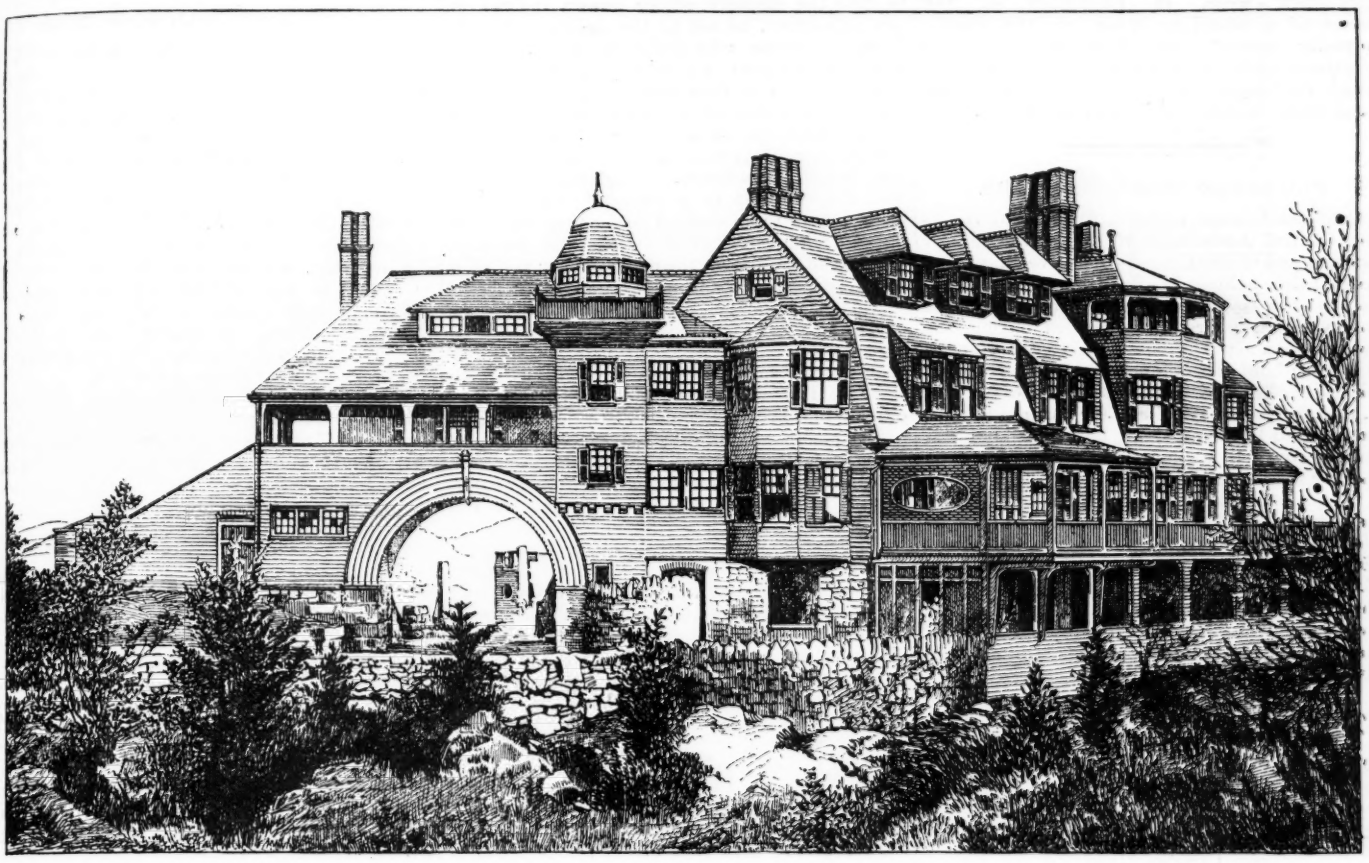
DETAILS OF WROUGHT IRON SCREEN, ST. OUEN, ROUEN.

PHOTO-LITHO SPRAGUE & Co. 22, MARTINS LANE, CANNON ST. LONDON, E.C.

IDDESLEIGH MANSIONS, WESTMINSTER.—Mr. Robert J. Worley, Architect.

PHOTO-LITHO., SPRAGUE & Co 22, MARTINS LANE, CANNON ST, LONDON, E.C.

A SKETCH IN CAUDEBEC.—By Mr. F. Williamson.



American Seashore Residence.—Messrs. Peabody & Stearns, Architects.

AMERICAN SEASHORE RESIDENCE.

WE give this as another example, of which we have given some previously, of the recent style of house-building adopted by American architects for rural or seaside localities, in which timber and shingles are largely employed. We have no information as to the precise locality of this house. The architects were Messrs. Peabody & Stearns.

HEATON'S CLOISONNÉ MOSAIC.

IN reference to this fine method of decoration, Mr. Clement Heaton, the inventor, sends us the following statement in regard to its quality of permanency, which will be of interest to those who may intend to make use of this new method of mural decoration:—

"1. General stoutness is insured by the basis consisting of sheet copper one millimètre thick (No. 20 Birmingham Wire Gauge). This entirely separates the colour from the wall surface and cuts off all chance of damp acting from behind.

2. The cloison wires are soldered along their whole length to this plate, and so firm is their adhesion that, armed with strong pliers, it is with great difficulty one can tear them off, and the whole plate can be beaten flat, when required, without damage to the soldering.

3. A keying of metal is likewise soldered to the copper ground to provide a honeycomb attachment for the mastic in parts where there are large expanses of colour without cloisons. Where this is not the case the burr formed on the brass in levelling, the retaining power of the cloisons, and the natural adhesion of the mastic, prevent it from separating from the copper.

4. Any deleterious action of the atmosphere on the metal is confined to the surface of the cloisons. These are carefully protected by strong lacquer-varnish, and can be made in any kind of metal or alloy, brass, copper, nickel, &c. Their sides and the soldered junction with the copper are effectually protected by the mastic filling. The golden sheen will last at least fifteen years, and the work can then be recleaned in a few hours.

5. As regards the mastic composition it is based on the principle of the old encaustic painting. White marble in the form of powder is bound into a hard composition by oleo-resinous matter and wax, and coloured as required with any inorganic pigment known to be permanent. This composition is pressed while hot into the interstices between the cloisons and sets immediately.

Such a material may be presumed to be permanent, but we have positive evidence which sets all question at rest. A mixture of resin and wax was commonly used in antiquity for water-proofing surfaces and preserving statues. White bitumen and wax, or resin and wax, is asserted by Pliny to have been the medium employed in the encaustic painting of antiquity. It is known that encaustic pictures from the hand of Polygnotus of Thasos endured for nine centuries, and were then only destroyed by their removal by a Roman Prætor. Two encaustic pictures, discovered at Stabiæ in a subterranean apartment in the last century, were as perfect as when painted nearly 1,800 years ago. Montabert mentions a number of pigments which are useless in oil but permanent in wax. Mr. Gambier Parry, in speaking of damp as the great enemy to wall-painting, says:—'Wax is an invaluable coating to the particles of colours and is unaffected by the atmospheric changes of cold or damp or dryness; it has strength to resist external damp, is free from chemical change on the most delicate colours, it does not change by age, it is rich enough to protect the colours from the atmosphere and from each other.'

Mr. Standage also attributes the permanency of old pictures to the oleo-resinous matter which was so much used with them. Sir Charles Eastlake says that wax has, if itself, no tendency to crack, and prevents cracking of the surface when mixed with resin ('Materials'). It is no wonder then that encaustic painting was so largely used in antiquity.

The application of the cloisonné system, then, does but introduce a new way of employing an old and trusty friend. By it the great difficulties attendant on the employment of encaustic painting directly on the wall are surmounted, in that the work can be finished in panels like stained glass in the studio and fixed without inconvenience and loss of time.

The addition of the marble powder is a decided advantage, as the resinous material becomes a binding material to the marble particles, and the composition has consequently great hardness."

The New Reredos at St. Paul's is now practically completed, and will be unveiled on the 25th inst. It is stated to have cost 24,000*l*.

ELECTION OF TWO DISTRICT SURVEYORS.

AT the meeting of the Metropolitan Board of Works on the 13th inst., the first business on the paper was to receive applications from candidates for two District Surveyorships, those, namely, of the Northern Division of the City of London and the District of "St. Anne Limehouse, St. John Wapping, the Precinct of St. Katharine, and the Hamlet of Ratcliff," in the room of the late Mr. Edmund Woodthorpe, who had held both appointments for a great many years. The Board having decided to appoint two District Surveyors, one for each district, thirty-seven candidates presented themselves. Their names, together with the number of previous applications made by them for similar appointments are as follow:—

Blackbourn, H., 5; Bridgman, H. H., 25; Brooker, J. W., 4; Cheston, H., 20; Coggin, C. T., 3; Cowper, P., 8; Eales, F. E., 7; Edwards, G., 12; Farrow, F. R., 5; Ferguson, J. M., 25; Francis, R. F. C., 12; Goodchild, J., 5; Gover, A. S., 1; Grellier, W., 26; Hamilton, F. W., 7; Hamilton, J., 15; Hamilton, Gordon G., 9; Hardcastle, W. J., 12; Haslehurst, E., 14; Heyes, A., 7; Inskipp, G., 20; Jackson, G., 20; Lean, G. A., 17; Mountford, E. W., 4; Nash, W. H., 19; Nicol, J. C., 1; Pelly, H. A., 10; Pownall, R. E., 11; Rawlins, H. A., 1; Saunders, C. G., 7; Saunders, M. L., 10; Slater, J., 3; Smallpeice, W., 26; Stevens, W. H., 17; Stock, H. W., 20; Swatman, E. L., 5; and Woodthorpe, E., M.A., 5.

For each appointment, the names of all the candidates were put to the vote separately, with the object of reducing the number to six. The election for the City was disposed of first, but as a matter of convenience we give the results of the preliminary (and as they turned out to be, the final) votings in respect of each appointment, viz.:—

	City.	Limehouse.
Bridgman	9	14
Francis	9	12
Grellier	9	12
Hardcastle	17	22
Saunders, M. L.	11	20
Smallpeice	15	19
Stock	24	35
Woodthorpe	35	—

It so happening that Messrs. Woodthorpe and Stock successively received in the first voting for each appointment the votes of a majority of the members of the Board present, those

gentlemen were, in pursuance of the terms of a standing order of the Board, formally elected,—Mr. Woodthorpe for the Northern Division of the City, and Mr. H. W. Stock for Limehouse. Each of the successful candidates returned thanks to the Board.

PLUMBERS' WORKING HOURS.

At a conference between representatives of the Central Association of Master Builders of London and of the United Operative Plumbers' Association, held at 31, Bedford-street, Strand, on Tuesday last, it was mutually agreed that the working hours of plumbers during the twelve winter weeks commencing the Monday following Lord Mayor's Day shall be as follows, viz., For the first five days of the week, 7 to 8, 8.30 to 12, and 1 to 4.30; for Saturday 7 to 8, and 8.30 to 12; making 44½ hours weekly: this rule to apply to all plumbers, whether society men or non-society men.

The agreement was signed for the Central Association of Master Builders of London by Messrs. Stanley G. Bird (Chairman), Frank May, John T. Chappell, B. E. Nightingale, and E. S. Henshaw (Secretary); and on behalf of the United Operative Plumbers' Association by Messrs. J. R. Beeston (Secretary), H. Bennett, J. W. Davies, R. A. Nurse, Wm. Husband, and Charles Hill (Chairman).

It was moved by Mr. Frank May, seconded by Mr. C. Hill, and unanimously agreed to, "That any further questions should be settled by conference."

ASSOCIATION OF PUBLIC SANITARY INSPECTORS.

THE January meeting of this body, held at the Westminster Town-hall, on the 7th inst., was devoted to the consideration of a proposal by Mr. George Smith, of Coalville, to bring the nomadic population of gipsy tents and travelling vans under the control of sanitary authorities. Mr. Smith, who seeks to extend the benefits of sanitary legislation and the civilising influences of education to the 50,000 persons leading a roving gipsy life in the different counties of England, in the way he has already done in the case of the canal population and the once-neglected brickyard labourers, read a lengthy and interesting paper on the subject. Commencing with the "Brickyard Crusade," which lasted from 1860 till the passing of a clause in an amended Workshops Act that sent 20,000 children from the brickyards to school, the history of the movement (which the lecturer has made peculiarly his own) was dealt with. The startling revelations made in the course of the long crusade he had carried on in the interest of nearly 100,000 persons forming the population of from 20,000 to 25,000 boats and barges navigating the 4,000 to 5,000 miles of our canals and rivers, had resulted at length in 1884, after twelve years of agitation, in the passing of the "Canal Boats Act." He would leave others to say fully what amount of good the Canal Boats Act had done, but the public records were there to prove that the death-rate among the boaters had been reduced very considerably, the stamina of our canal population increased, and the spreading of infectious diseases checked. Thousands of canal boat children were now going to school, or were being taught in other ways, that would not, in all human probability, but for the Acts. The chief object of his later efforts was to ameliorate the horrible conditions under which nearly 30,000 children and their parents were living in vans travelling to shows and fairs, or in gipsy tents or wigwams in lanes, fields, and commons all over the kingdom, by obtaining legislative sanction for his "Temporary Dwellings Bill,"—a Bill which was amended by a Select Committee after passing the second reading in the last session of Parliament, but was subsequently blocked. Many appalling facts were given (selected from a very large number that had come under the lecturer's observation) to justify his exertions to make "the cries, now becoming pitiful wails, of 30,000 gipsy and van children, for education, protection, and sanitation, ring loudly in the ears of our legislators." What he wanted, without interfering with liberty, in the first place, mainly, was that vans and other abodes of the kind should be registered annually in a simple, easy, and inexpensive manner, so as to give the sanitary officer power, instead of the policeman, to see to the health and well-being of those who dwelt in them. And, secondly, to give all travelling, canal, and gipsy children a free education, which could be brought about by means of a free educational pass-book on a plan set forth in the lecturer's writings and in the plans put before the Select Committee. Registration would lead step by step to a complete reform, the chief points to be secured being that no young persons from the ages of twelve and fourteen be allowed to sleep in the same tent or van with adult parents, except under conditions compatible with health and morality, the free education and legislative protection of children, and the compulsory notification of the number of persons such temporary dwellings were registered to accommodate by its being painted outside in a prominent place.

Mr. Smith was frequently interrupted during his long address by the applause of the members, who were present in great numbers; and in the subsequent discussion, opened by the Chairman (Mr. Hugh Alexander), and continued by Messrs. Boulter (Bexley), Legg (Hon. Sec.), Hearne (Paddington), Richards (Battersea), Hurlock (Limehouse), Mitchell (Croydon), and Middleweek (Kensington), the obligations of the members to the lecturer for the great store of important and pertinent facts he had given were warmly acknowledged. Testimony was borne by Mr. Richards, Mr. Hearne, and Mr. Edwin Guest to the improvement which had already taken place in the educational and sanitary condition of the classes for whom Mr. Smith had obtained the protection of the law, partial and incomplete though the measures so far adopted were admitted to be.

In replying to a vote of thanks, Mr. Smith said that, notwithstanding the undertaking by canal-boat proprietors to build schools along the banks of the canals, not a single school had yet been built.

Midland Counties Association of Public Sanitary Inspectors.—A special meeting of the members of this Association was held at the Council House, Birmingham, on the 5th inst. There was a good attendance. The business for consideration was:—1. The affiliation proposals of the (London) "Association of Public Sanitary Inspectors." 2. To consider proposed alterations and additions to the rules of the Association. The Chairman of the (London) Association of Public Sanitary Inspectors, Mr. Hugh Alexander, was present, and addressed the meeting, quoting certain portions of their rules bearing on the question of the affiliation of branches. A motion affirming the desirability of becoming affiliated with them was then proposed and seconded. After a long discussion the motion upon being put to the vote was lost, and the following resolution adopted:—"That the Midland Association of Public Sanitary Inspectors decline to become a branch of the (London) Association of Public Sanitary Inspectors, or to be affiliated therewith upon the terms and under the conditions as set forth in their rules and as now submitted, but that this Association hereby expresses its willingness and readiness on all occasions to co-operate with any Society or Association of Sanitary Inspectors in the United Kingdom having similar objects in view to those which are set forth in our rules and with a view to their mutual benefit, and for the advancement of their common interests." It was considered by the speakers who addressed the meeting to be very desirable that all sanitary inspectors and the like officials throughout the country should be in touch with each other and be thoroughly combined. The meeting was, however, not agreed as to how this desirable unity could best and most satisfactorily be attained. On the motion of Mr. W. Harris, seconded by Mr. F. Booker, of Coventry, a vote of thanks was passed to Mr. Alexander, of London, for his attendance.

Storage Batteries for Telegraphic Purposes.—We understand that the Exchange Telegraph Company have for six months past employed Storage Batteries to work the Stock Exchange "tapes" from their office in Cornhill. Two thousand primary batteries were formerly required, but their work is now adequately performed by 210 "E.P.S." accumulators, arranged in three series of seventy each.

ARCHITECTURAL SOCIETIES.

Birmingham Architectural Association.—The fifth ordinary meeting of this Association for the current session was held at Queen's College on Tuesday evening last. Mr. John Cotton took the chair. A discussion was opened by Mr. W. Henman on "Fair Trade and Free Trade in Architecture," in which the following gentlemen took part:—Messrs. W. H. Bidlake, J. Cotton, H. Lloyd, J. Ward, S. Harris, and Victor Scruton (hon. sec.). The opinion of the meeting, we are informed, was decidedly in favour of closing the profession, and instituting examinations on the same basis as other professions. A hearty vote of thanks was accorded to Mr. Henman for the manner in which he had opened the discussion.

Leeds and Yorkshire Architectural Society.—The Rev. Canon Scott, Vicar of St. John's, Leeds, on Monday evening last lectured before the members of the Leeds and Yorkshire Architectural Society on "The Transitional Periods of Gothic Architecture." Mr. W. H. Thorp presided. According to the report in the *Leeds Mercury*, the lecturer said that architecture could be divided into the two sections of the trabeated and arcuated,—the architecture of the beam and that of the arch. The buildings of the early Hindoos, Egyptians, Greeks, and Romans were of the former class; and the introduction of the vertical or arcuated style was almost contemporaneous with the advent of Christianity. He first described the arcuated work of the Romanesque as comprised in the Lombardic in Italy, the Byzantine in Constantinople, and the Norman north of the Alps. The special characteristics of the Norman style as found in England, were the round arch with the cushion capital, the zigzag moulding, and the square abacus on which the arch rests. The transition from the rounded to the pointed arch arose out of constructive necessity, found continually in the new and improved style of building, which enabled architects to vault over different spaces, to economise materials, and to use thinner walls and piers, and to make up for the thrust of the pointed arch by buttresses. The first style of Gothic was the Early English, and was distinguished by the pointed arch, the tooth ornament in the mouldings, and the lancet lights in the windows, of which our finest examples are those of the north transept at York, the Beverley Minster, and the Salisbury Cathedral. The second transition was exemplified by the Decorated style, which was to be found in the origin and development of tracery in the windows and the change from plate to bar tracery. Quoting from Ruskin's "Seven Lamps of Architecture," Canon Scott described this beautiful development, and continuing, said that the style lasted through the reigns of the three Edwards, and was divided into the geometrical and the curvilinear Decorated. From this point Gothic architecture rather deteriorated than advanced. The next transition was into the Perpendicular style, in which the tracery of the windows assumed vertical lines. Several of the noblest specimens of this style were described, and it was pointed out that this form lasted in varying phases up to the Reformation. The latest phase of this order was the Tudor work of Henry VII. From this time a debased form, known as the Elizabethan, and which was chiefly confined to domestic buildings, was in vogue during Elizabeth's reign. A futile attempt was made to bring it back, even subsequent to the Rebellion, and some of the college chapels at Oxford and Cambridge afforded specimens of the Jacobean Gothic. It was quite possible to point out the exact time when the decadence commenced. It was superseded by the revival of the antique and pagan styles, commonly called the Renaissance. The invention of printing introduced to Christian Europe the ancient pagan authors, and so fascinating was this knowledge, gained for the first time, that the great idea which filled all minds was how most nearly to copy the ancients in their lives and modes and expressions of thought. Besides, the discovery of America, with its rich mines of precious metals, also so roused the avaricious in man that what had formerly been given to God was now spent in fitting out vessels of discovery and merchandise, so as to gather in the riches of other lands. It was quite incorrect to lay to the Reformation the decadence and degeneration of art, as the descent began two centuries prior to the Reformation, and the Renaissance

had already entered on its existence before Henry VIII. defied the Pope. It was well known, too, that the last persons to take advantage of the Gothic revival in our day were the members of the Roman Catholic persuasion, and that in Italy there was less of Mediæval Gothic to be found than in any other country. At the conclusion, on the motion of Mr. J. H. Greaves, seconded by Mr. W. Howgate, a vote of thanks was passed to the lecturer.

Sheffield Society of Architects and Surveyors. — The third meeting of the present session was held on the 10th inst. at the School of Art to hear an address from Mr. J. Murgatroyd, F.R.I.B.A., of Manchester, on "Association and Federation." There was a large attendance of members and visitors. Amongst those present were:—Messrs. T. J. Flockton (President) in the chair, J. W. Connon (Leeds), J. D. Webster, C. Hadfield, J. B. Mitchell-Withers, J. T. Key, C.E., E. Holmes, J. Fawcett, J. Hall, J. T. Wheen, E. M. Gibbs, Thomas Winder, J. Clark, W. F. Hemsoll, J. Smith, A. F. Watson, J. M'Inery, E. M'Dougall, E. Winder, jun., W. F. Ragg, C. Gibson, G. F. Terry, A. J. Greenwood, H. W. Lockwood, W. Watkin, A. E. Turnell, C. B. Flockton, J. Norton, C. M. Hadfield, W. Potts, W. A. Hall, G. H. Genn, J. B. Mitchell-Withers, jun., J. E. Bruton, J. R. Wigfull, W. C. Fenton (Hon. Secretary), and others. In the course of an able and instructive address Mr. Murgatroyd urged the desirability of forming associations of architects and surveyors throughout the country. He showed the advantages that would follow,—greater power in dealing with local authorities, builders' associations, and reforming abuses which damage both architect and client, higher standard of professional education, &c. He deprecated Lord R. Churchill's recent remarks at Newcastle with respect to architecture, and asserted that this branch of science and art was holding its own in the country. With regard to federation, he showed that whilst association benefited individual members, federation benefited individual associations or societies. He urged the affiliation of all existing societies with the Royal Institute of British Architects in London, and showed the advantage that would accrue to both the profession and the public generally. A discussion ensued. in which Mr. J. D. Webster, Mr. J. B. Mitchell Withers, and Mr. J. W. Connon (Leeds) took part.

Edinburgh Architectural Association. — The usual fortnightly meeting of this Association was held on the 12th inst., in the Architectural Hall, 42, George-street, the President, Mr. Hippolyte J. Blanc in the chair. After the usual preliminary business, a lecture on certain Scottish castles not described in the recent work on "The Castellated and Domestic Architecture of Scotland," was delivered by Mr. Ross, architect. The lecture was illustrated by upwards of 200 drawings, including representations of castles in all parts of the country, particularly in the west and south-west, such as Skipness, Loch Ranza, Portincross, Kilburn, Mugdock, Dunheath, Bardowie, and other castles on the Clyde and in the neighbourhood of Glasgow. Skipness was described as being one of the most splendid specimens of military architecture in Scotland, and in a most perfect state of preservation, although dating from the thirteenth century. Certain minor castles on the Clyde, such as Little Cumbrae, Fairlie, Skelmorlie, had, it was pointed out, a great resemblance to each other, both in size and appearance, some of their dimensions being identical; but their most marked similarity consisted in their internal arrangements of hall and kitchen, which characterised them as a group of buildings peculiar to the district. The more important castles in Ayrshire and Galloway, such as Loch Doon, Irvine, Penkill, Dalquhanan, Closeburn, Mochum, Dunsky, Russ. Loch Naw, Kenmure, and Hills were illustrated. Special attention was directed to Loch Doon Castle, which stands on a small island at the southern end of the loch. The castle is nearly circular on plan, consisting of eleven sides, the south side being about twice the length of any of the others. The whole is in a most appalling state of ruin, it having lately been attempted to bring down the south wall by removing the lower courses of masonry. The castle is of great age, probably dating from the thirteenth century, and merely as a picturesque feature in a wild and bleak district, and altogether apart from its historical associations, it is worthy of better treatment. Mochum, which has lately been restored by the Marquis of Bute, was referred to as a remarkable building, consisting of two distinct castles, separated from each other by about 20 ft., and connected by a high wall. Along the eastern Borders, Cessford, one of the most massive piles in Scotland, was fully described, as well as Little Dean, Hutton, Innerwick, Lethington, and Merchiston,—the two latter being most interesting in themselves, having several architectural points of resemblance, and both having been the homes of celebrated men. Queen Mary's house in Jedburgh, Kirkhope, and Oakwood Towers, with various castles along the Forth, such as Blackness, Frangipans, Bridge Castle, and Bonhard, were included among examples; while in Fife and Forfarshire, and as far north as Ackergill in Caithness, many examples were illustrated. As regards Queen Mary's house, the lecturer was of opinion, notwithstanding the doubts which have been expressed to the contrary by various writers, that it was within the bounds of possibility that the house was as old as the time of the unfortunate queen. At the close, a hearty vote of thanks was accorded to Mr. Ross for his paper.

Glasgow Architectural Association. — The usual monthly meeting was held on the 10th inst.,—the President in the chair,—when a paper on the Cathedral Church of St. Magnus, Kirkwall, was read by Mr. John Macara, B.Sc., Member. The story of the founding of this out-of-the-way example of architecture possessing many features of peculiar interest, a considerable portion of the paper was devoted to a sketch of Orcadian history, both social and ecclesiastical. Nearly the whole of the edifice was erected previously to the middle of the fifteenth century, when the islands passed from Norwegian to Scottish ownership. Though thus strictly foreign the cathedral closely assimilates to contemporary buildings further south. The various periods at which it was built, ranging from 1136 to 1500, give at once architectural variety and antiquarian interest. St. Magnus's Cathedral, like our own St. Mungo's, while fortunate in escaping utter demolition at the Reformation, has yet since that time suffered severely,—from vandalism, which has wantonly destroyed; and from ill-regulated zeal, which has over-restored. By means of measured drawings prepared by the essayist, supplemented by others lent by a member, and by numerous photographs, the subject of the paper was very clearly illustrated and described. At its conclusion, after a short discussion, a very hearty vote of thanks was awarded to Mr. Macara.

WATER SUPPLY.

Hertford.—The Corporation of Hertford is increasing the water supply of that town by sinking an 8½-in. Abyssinian tube well about 100 ft. deep, to draw an additional supply of about 170,000 gallons per day from the chalk springs. This work is being carried out under the supervision of Mr. W. H. Wilds, the borough surveyor, and the contract for the tube well has been given to Messrs. Le Grand & Sutcliff, of Bunhill-row.

Sheffield.—On the 2nd inst. the Sheffield Corporation took possession of the undertaking of the Sheffield Water Company, for which purpose they obtained an Act of Parliament last session. The price was rather over two millions, and the result of the arrangement has been to increase the value of the ordinary shares, on which 100*l.* is paid up, from 60*l.* to 90*l.* The Corporation retain the services of the Company's staff for three years.

CASE UNDER THE METROPOLITAN BUILDING ACT.

NEGLECT TO GIVE NOTICE TO DISTRICT SURVEYOR.

At the Greenwich Police-court, on Saturday, Jan. 14, Mr. W. J. Beales, builder, of 33, Totteridge-road, Battersea, was summoned by Mr. C. J. Badger, District Surveyor of Lewisham, for unlawfully commencing to make alterations to six dwelling-houses, Nos. 1 to 6, Whatman-road, Brockley-road, Forest Hill, and neglecting to give notice of such alterations to the District Surveyor, as required by the Metropolitan Building Act. Mr. Badger said the defendant (who did not appear) was in a good way of business, and these buildings belonged to the Birkbeck Building Society. He had had no communication whatever from the defendant. The foreman told him he supposed that the defendant must have been so busy that he forgot all about the matter. Mr. Marsham inflicted a fine of 40s. and 2s. costs, but refused personal costs to Mr. Badger.

BEAUMARIS AND ITS DRAINAGE.

SIR,—The drainage of Beaumaris is not what it should be. Main and branch drains of rough stone carry away into the sea the rain falling on the surface and the liquid sewage produced in the houses. Considering the numerous population of Beaumaris, and the large number of people who visit it in the summer and autumn months, the Town Council wisely determined a few years ago to provide a new system of drainage.

The scheme first submitted for this purpose had the usual pipe sewers and house and gully drains for receiving the sewage and rainwater in combination; the usual elongated sewage-tank for holding the drainage while the tide prevented it from discharging; and the usual ventilators, which, while they professed to sweeten the sewers, fouled the atmosphere at the surface over them. As by this scheme the drainage would be ponded in the elongated tank and its contributories for several hours during each tide, and as the gases emitted from the ponded drainage would escape partly by the house-drains into the houses, and partly by the gullies and ventilators into the streets, it was properly and wisely rejected.

Another scheme, subsequently submitted, was Mr. Shone's hydro-pneumatic system. As by this scheme the rain falling on the streets, and a large portion of the rain falling on the houses, would be conveyed by the existing drains direct into the sea, and as the sewage produced in, and a small portion of the rain falling on, the houses would pass into pipe sewers constantly discharging into ejectors, and from these (the moment each was full) the drainage would be ejected by compressed air above high-water level, and flow from thence down into the sea-channel under low-water level, it was adopted. A further admirable feature in this scheme, besides completely discharging the sewage from the town as fast as it was produced, was the ensured economy to the ratepayers in its first cost and future working expenses.

The installation for receiving and discharging the house-drainage comprised the sewers, the junctions thereon for connecting the house-drains thereto, the ejector stations and ejectors therein, the pipes for conveying the sewage into the ejectors and from them into the sea, the gas-engines for compressing air, and the pipes for conveying the compressed air to the ejectors for ejecting the drainage. This installation was completed, ready for connecting the house-drains with it, in the summer of 1886.

It may here be mentioned that the Town Council, by appointing (1) their own clerk of the works, and (2) a few of themselves to act as a drainage committee, were more than usually interested, energetic, and vigilant in seeing that the works were properly executed in accordance with the specifications prepared by their engineers, Messrs. Shone and Ault. But, notwithstanding all this, the Town Council have been, ever since the above described installation was completed, in a state of paralysis, allowing it to lie dormant, and no house-drains to be connected with it, because they found that, with all their care and vigilance, a quantity of water leaked from the subsoil into the sewers through some of the joints of the sewer-pipes, and through most of the joints of the discs put into the sockets of the junctions for receiving the house-drains.

The leaks are found to be under the flat part of the town, between Castle-street and the seaside, where the water-level in the subsoil is 7 ft. above the level at which the lowest main sewers have been laid. With regard to this leakage, there is no doubt that, instead of it being injurious, it is a positive advantage, not only to the sewers, but to the town, at this part (1) by increasing the flow and scour of the sewage when the streams are but mere driblets, and (2) by permitting the foul water in the subsoil, which consists of percolations from the old cesspools and drains, to gradually drain away, and to be replenished by an inflow of clean water. Recent experiments show that the total leakage is 58½ gallons, or 9·37 cubic feet per minute. This, as I have said, will cause the sewers to be self-cleansing, without flushing, when the sewage currents are small and weak; and at the same time it will keep the subsoil beneath the flat part of the town, where the visitors mostly congregate to enjoy the sea-air, sweet and clean.

When the Town Council became aware of this leakage into the main sewers they at once

fell away from the wise course they had hitherto pursued, and not only refused to proceed with the drainage of the houses, and connecting the house-drains with the new sewers, but resolved not to pay the contractors, Messrs. Hughes & Lancaster, of Chester, the balance due to them for the installation as completed, and certified for by their own engineers. Owing to this the contractors had no alternative but to take law proceedings against the Town Council to recover the amount due to them.

It resulted from these proceedings that Mr. Edward Pritchard, C.E., was appointed to arbitrate upon the matter. At intervals from September to December last that gentleman patiently and thoroughly examined into every question connected with it, and the outcome of it is that he recently gave his award, with all costs, against the Town Council.

With the arbitrator's authoritative decision as to the thoroughly efficient character of the installation the Town Council should now be satisfied, and should forthwith order the house-drains to be properly formed and connected with the new sewers. When this is done, the installation would perform its functions most satisfactorily, and Beaumaris would be one of the best drained and most healthy watering-place in Wales. JOHN PHILLIPS, C.E.

OCKWELLS MANOR HOUSE.

SIR,—In last week's number of your journal you gave an illustration of "Ockwells." It would, perhaps, be well for your readers to be informed that all that is interesting in this relic of the past is in danger of being destroyed. I understaud the present owner of the property states that he cannot throw away money in restoring the house, simply as a hobby, but must make it suitable for his requirements. He has decided to build an embattled tower at the back of the house, and has already commenced building a warehouse where the garden wall skirts the high road, but the latter being away from the house does not much injure it, although the picturesqueness of its surroundings will be affected. The proposed alterations to the interior would destroy all its antiquarian and architectural value. The hall (represented in Nash's Mansions) would be divided into two stories containing three rooms and a staircase. An entrance-door would stand where the lovely bay-window now is, and the porch would be removed.

The owner of the property is very reluctant to do anything which will destroy the interesting character of the house, and would, I believe, surrender it to any antiquarian society, provided they would undertake to properly restore and maintain it.

I am in no way anthorised to make these suggestions, but possibly the insertion of this letter may have the effect of averting the destruction of one of the now fast-disappearing relics of past times. If the societies have no funds, there must be many individuals who could, with great ease and pleasure to themselves, provide the money for such a purpose.

SYDNEY W. LEE.

A NEW DEPARTURE IN BRAZING AND WELDING.

SIR,—The cheapening of oxygen by Brin's process of manufacture has put into the hands of metal workers a new power. I have recently made a few experiments with the compressed oxygen and coal gas, and found that with a ½-in. gas supply a joint could be brazed in a 2-in. wrought-iron pipe in about one minute, the heat being very short, the redness not extending over 1 in. on each side of the joint.

The appearance of the surface after brazing led me to experiment further with welding, a process which is not possible with ordinary coal-gas and air, owing to the formation of magnetic oxide on the surfaces. Contrary to my expectation, a good weld was obtained on an iron wire, ⅛ in. diameter, with a very small blowpipe, having an air-jet about $\frac{1}{32}$ in. diameter. This matter requires to be taken up and tried on a large scale for such work as welding boiler-plates, which, it appears to me, can be done perfectly with far less trouble than would be required to braze an ordinary joint. The great advantage of this would be that the boilers would require no handling, but could be welded with an ordinary large blowpipe in position, and with about one-tenth the labour at present necessary.

The cost of the oxygen is trifling, and it is evident, from the results obtained in brazing, that the consumption of gas would be considerably less than one-fourth that necessary with an air-blast, irrespective of the fact that welding is possible with an oxygen blast, whereas it is not possible if air is used. The surface of iron heated to welding heat by this means comes out singularly clean and free from scale, and a small bottle of compressed oxygen, with a blowpipe and a moderate gas supply, would make the repairs of machinery, boilers, brewing coppers, and other unwieldy apparatus, a very simple matter. The trouble and difficulty of making good boiler-crowns, which so frequently "come down," would be very small indeed, when the workman has an uulimited source of heat at command, under perfect and instant control. THOS. FLETCHER.

Warrington, January 17, 1888.

"SHORT" QUANTITIES.

SIR,—A building case was concluded last week before Mr. Justice Stephen, in the Court of Queen's Bench, that of "Priestly and Gurney *v.* Stone," the great importance of which to architects, surveyors, and builders, warrants my troubling you with a few lines in regard to its unsatisfactory termination. The plaintiffs are builders, who tendered for a Roman Catholic Church at Chiswick, upon advertised quantities prepared by the defendant, and obtained at the architect's office on payment as usual. As the work went on, and before the whole of the fees had been paid, the quantities were discovered to be inadequate, "short" in many particulars, and the plaintiffs objected to paying the balance of the surveyor's account without a letter from him promising to make good to them his deficiencies. They could not obtain the letter, and, as the deficiencies appeared serious, sued him for the loss caused by them, his reply being a counter-claim for the balance of his account. The plaintiffs' case only was heard, as after a few words from the defendant's counsel, the Judge directed a nonsuit to be entered, and gave judgment for the defendant upon the counter-claim. He laid down upon the point of misrepresentation, alleged by the plaintiffs' counsel, that the misrepresentation could not be charged against the defendant, but against the architect or the building-owner! He was evidently misled by attaching undue importance to the architect's having issued the quantities; and when the question of the surveyor's signature of the endorsement being his guarantee was mentioned, the defendant's counsel objected to the point of warranty being raised, as it had not previously been set forth. Upon the other main point, that of contract, the payment by the builder of the charges constituting a liability to him on the part of the defendant, the Judge laid down that there was no privilege of contract, being misled here no doubt by the evidence of one witness, who stated that in the event of a builder failing after signing the contract, a quantity surveyor could recover his charges from the building-owner. The direct contrary is the case, as we found to our cost in 1873, having been nonsuited on that very point. It was then clearly settled that the signing of the contract transfers the liability of the building-owner to the builder, that only the latter can be sued. In accordance with this decision, we have more than once claimed against and received a dividend upon a bankrupt builder's estate. There was one other point which had weight with the Judge, viz., a sentence in the specification providing that the builder should "compare quantities with the site and with the drawings before signing the contract, as no after-claim would be allowed." This sentence was strongly condemned by all the witnesses, Mr. F. J. Dove and Mr. J. T. Chappell declaring that they would not sign a specification containing such a sentence; but the result undonbtedly was to tie the builder's hands in a way which made the Judge reluctant to untie them. Upon this point the Judge, taking up a remark of Mr. Dove's, very properly insisted that quantities ought always to be made a part of the contract; and if that were a result of the present case, good would have been done, though, unfortunately, at the expense of Messrs. Priestly & Gurney. With regard to the latter, the real injustice of the nonsuit must be so apparent to every one with an intimate knowledge of the usual practice, that I for one greatly hope that the Master Builders' Association will take the case up, and press for an appeal. I may add that I was present but not called as a witness, and am only interested in the case as it must interest every member of the profession. HENRY NORTHCROFT.

57, *Charing-cross, S.W.*, Jan. 16, 1888.

TESTING QUALITY OF MORTAR.

SIR,—I shall be greatly obliged if some kind reader will inform me of a reliable and ready means of testing the quality of lime mortar.

URBAN.

BRASSES OF CAMOYS AND CREKE.

SIR,—In my paper on "Brasses," reported in the *Builder* of Saturday last [p. 30], I find I omitted to mention that at the right foot of Lady Creke's brass is a monogram, consisting of the letter N, above which is a cross, on either side a half-moon and a star. The letter is also to be found on the base of the brass to Lord Camoys on the side nearest to Lady Camoys. Owing to the small scale of the illustrations, they are not seen. A. OLIVER.

"TITE PRIZE, 1888."

SIR,—The R.I.B.A., in their rules for competition for this subject, state:—"The geometrical drawings must be drawn in outline, with their sectional parts only tinted or hatched."

The four competitors who were placed had either tinted or hatched the windows, and in several instances the recessed portions.

This is unfair to those who were so simple as to stick to the exact letter of the instructions, as every draughtsman knows how a drawing can be brought out by shading.

While heartily agreeing with the ruling of the judges, it will be taken as a lesson for the future by

ONE WHO WAS OUT OF IT.

BOOKKEEPING.

SIR,—In reference to a letter in your issue of the 14th inst. [p. 33], I would strongly recommend that "Subscriber" should try "Kains' system" of book-keeping.

I have now used this method for several years, and have never met with a clearer or shorter way of keeping accounts.

Should your correspondent desire ny information on the subject, I shall be happy to give him any in my power. E. S. MITCHELL.

33, *Friar-lane, Leicester*, Jan. 17.

P.S.—This method is copyright, and Messrs. Kains' address is 59, Chancery-lane, London, W.C.

PROVINCIAL NEWS.

Birmingham.—In the early hours of the New Year the task of "threading" the cable of the Hockley tramway was successfully accomplished, according to the *Daily Mail*, which gives an interesting account of the operation. To understand the nature and the difficulty of the "threading" operation it is necessary to say that the principle of the cable method of traction is to run an endless cable through a small subway or chamber beneath the centre of the outward track, and back by the return track, to keep the cable circulating by means of stationary driving machinery at a depôt, and to furnish the cars with mechanism to clutch the moving rope when they want to be pulled along by it, and to loose it when it is desired that they shall stop. The clutching apparatus reaches the moving cable through a slot in the roadway. The subway or chamber through which the cable runs is 2 ft. 6 in. deep, and at intervals of 30 ft. contains 13-in. pulley-wheels, upon which the cable runs, and by which it is prevented from dragging. There are some revolving horizontal curve pulleys at points where the road curves slightly, to keep the cable in its proper position in the chamber, while at the bend at the top of Snow-hill there are horizontal pulleys on the inside of the curve, close together. There is an elaborately-constructed subway at this corner, and a large pit at the terminus in Colmore-row, opposite St. Philip's Church, where the cable descends to a lower level, and then passes round a nearly horizontal wheel, the diameter of which reaches from the slot of the outward line to that of the return track. At Hockley there are wheels of a similar kind, which turn the cable into the depôt, where it passes through the driving machinery. The slot over the chamber is but 13-16ths of an inch thick, whilst the cable, composed of crucible steel, with a Manila centre, is over an inch in diameter. The latter cannot, therefore, be dropped down through the slot, and the method of threading is to insert the cable end in the grasp of a gripper depending from a bogie carriage in the subway outside the depôt, and with this to drag it through the whole circuit in which it has to pass. The difficulty arises in keeping hold of the end of the cable and getting sufficient traction to pull the whole length of rope, and to overcome its friction upon the pulleys. There are also risks of the cable "kinking" and getting badly damaged. It was intended to begin between eleven and twelve o'clock on Saturday night. The cable, coiled on a single reel, was hung on a swivel

supported by sheer legs in the yard of the depôt at Whitmore-street, beyond the winding machinery. The end, spliced to a 40-fathom length of thinner cable, was pulled out to beneath the road at Hockley. Several bogies with grippers specially strong for the purpose were ready upon the line, and three tramway locomotives were in attendance to pull them along. It had been intended that the 50 yards of thin rope should be pulled along as slack by a pair of horses, that then behind the splice the cable should be fixed to a bogie moved by a locomotive; and that 50 yards behind a second bogie should be attached and drawn by two engines. About a quarter to one o'clock the cable was firmly fixed to the first bogie by men in the subway, and it was soon found that considerable modification of the methods proposed would be necessary. In the first place it was found on setting forward that the splice between the thin rope and the cable would catch the pulleys, and the thin rope had therefore to be abandoned. When the next attempt was made it was found impossible to keep the two engines going at the same pace, and the second one, getting on a bit too fast, began to double the cable in the chamber. In order to prevent a similar occurrence it was determined to have only one pull, unless it should be absolutely necessary, and the pair of engines at the second bogie were released from it, the bogie, however, remaining gripped and to be pulled along. This arrangement succeeded, and the top of Hockley-hill was reached without hindrance and with little delay. In the further part of the course, however, progress was more slow. The bottom of Constitution-hill was reached about five o'clock. From Great Hampton-row two engines were employed as far as the Snow-hill Station, where a third engine was attached, and they safely landed the cable to the summit by half-past five o'clock. It was expected that the turn into Colmore-row would offer some awkward difficulties, but the engines rounded it splendidly, and a hearty cheer from those concerned hailed the success of the first half of the journey. At this point it became necessary to transfer the cable from the up to the down line. The cable was released from the gripper of the leading bogie, which was then transferred to the return line, the rope reattached to the gripper, and the return journey commenced. There were now two locomotives leading and one following the grip-bogie, all being coupled. Considerable difficulty was experienced nearly opposite the end of Livery-street, consequent upon the slot having been closed by the wood-paving, and all the power of the three locomotives was found necessary to pull the gripper through this obstruction. The journey was then continued, and the cable was returned to the depôt at a quarter to nine o'clock, the back journey having occupied about an hour. The successful operation was conducted under the supervision of Mr. Pritchard, the engineer to the Company. The total operation of haulage to and from the depôt, a distance of about 2½ miles of rope, was completed within six and a half hours. At Edinburgh, where a line of cable-tramways has just been laid, the operations without the advantage of steam extended over several days. General Hutchinson, of the Board of Trade, has made an unofficial inspection of the works, driving machinery, pulleys, and cars. Each car has a gripper at either end, the one for the outward and the other for the return journey. The driver stands upon the platform in charge of two levers acting in opposite directions. The one actuates the gripper, and the other a brake on the wheels of the car. For cases of emergency there is also a rotating brake which applies a powerful slipper to the rail. Each car accommodates forty-four passengers,—twenty inside and twenty-four out.

Leeds.—The new head-quarters of the Leeds Rifles are situated between Carlton-hill and Claypit-lane, and are the premises which have been for years known as the Militia Barracks. The land was purchased and the buildings erected upwards of twenty years ago by the West Riding Justices, for the accommodation of the 4th West York Regiment of Militia; and when that regiment ceased to be trained in Leeds the premises were unoccupied, and they have recently been purchased for the Leeds Rifles from the West Riding Justices for 9,500*l.* The total area of the property is nearly five acres (23,734 square yards), and the purchase includes all the buildings erected for the accommodation of the Militia. These require considerable alterations to adapt them to the purposes of the Volunteers,—the principal alterations being the erection of a drill-hall, the conversion of the guard-room and cells into an armoury, and the erection of a sergeants' mess. When these alterations are completed, the buildings will include a drill-hall, 120 ft. by 60 ft., an armoury and lavatory, &c., adjoining, with sergeants' mess and lecture-room over, and stabling for the field-officers' chargers. These buildings lie to the right of the main entrance from Carlton-hill, and on the left is a range of buildings, including orderly-room, commanding officer's room, adjutant's room, quartermaster's store, and men's recreation-room, with officers' mess over. The alterations are being carried out from the designs of Mr. C. J. Fowler, of Leeds, who is a captain in the regiment. The alterations are now in progress, the contractors being: for the bricklayer and mason's work, Messrs. Longley Bros.; carpenter and joiner's work, Mr. Wood, of Headingley; plumber's work, Mr. John Fox; plasterer's work, Messrs. Franks & Evans; slater's work, Messrs. John Atkinson & Son; painting work, Messrs. Dearden Bros.

Ruabon.—A cottage hospital, built by Sir Watkin Williams Wynn, Bart., in memory of his late uncle, the sixth baronet, was opened recently at Ruabon. The hospital movement was originated in the district some eighteen years ago by the late Sir Watkin and Lady Williams Wynn, who took a deep interest in the work. From the beginning the premises which have been used up to the present time have been regarded as only temporary accommodation, and some time before his death the late baronet marked out the ground upon which the new building has been erected. The present Sir Watkin, with Lady Williams Wynn and Mr. and Mrs. Owen Slaney Wynne, have shown great interest in the undertaking. The hospital, which is situate on the left side of the road leading to Rhosllanerchrugog, in close proximity to the village, is built from designs by Mr. W. H. Spaull, architect, Oswestry. The lower part of the building is faced with red bricks and terra cotta; the upper part is half-timbered, the oak used for the purpose being grown on the Wynnstay estate. The roofs are covered with red tiles. One noticeable feature is that, instead of unsightly ventilating pipes from the drains being carried up the walls and roofs, they are brought up out of sight, with the outlets through the centre of the finials on the octagon roofs. On entering the building, a door in the passage, opposite the front door, leads to the domestic offices, which consist of kitchen, scullery, larder, store-room, wood, coals, laundry, and wash-house, the doors of the latter opening into a paved yard. The first door on the left is the committee-room, whilst that on the right is the operating-room, from which a ward with one bed is entered, for patients requiring isolation. To the left is a short corridor, leading to a ward with two beds, and at the end of the principal corridor is the large ward, with five beds. Between the two is the nurses' room, with a window looking into each ward. The bath-room, lavatory, &c., are isolated in each case from the wards by a short passage with windows on each side. There is a verandah on one side of the large ward for convalescents to take the air in fine weather. On the first floor are four large bedrooms for the staff. In the cellars is a heating apparatus, supplied by Messrs. E. Thomas & Co., of Oswestry, which warms the corridor, operating-room, and all the wards. The wards, lavatories, corridors, &c., are lined 4 ft. high with glazed bricks from the works of Mr. J. C. Edwards, who also supplied the terra cotta. The bricks were from Mr. Bowers's works. Mr. H. Lewis, of Oswestry, executed the painting and staining work. Sir Watkin furnished the whole of the hospital, with the exception of the two-bed ward, which, by permission, is called the "Nesta Ward," and was furnished by Mr. J. C. Edwards, of Trevor Hall. The inscription in terra-cotta entablature over the front door is "This Hospital was erected in 1886 to the memory of Sir Watkin Williams Wynn, Sixth Baronet, by his nephew and successor, Sir Watkin Williams Wynn, Seventh Baronet."

Weston-super-Mare.—Two new wards at the Weston-super-Mare Hospital, to be known as the "Jubilee Memorial Children's Wards," have lately been formally opened. The larger of the two new wards is an extension southward of what was formerly the men's ward, which has been nearly doubled in size, and is at present T-shaped, affording accommodation for nine children's beds. The new portion is an elongated addition, placed at a right-angle with the old, and to the front of the addition there is a large bay window, containing in its upper part a centre light upon which are the Royal arms and numerals representing the present year, and two side lights respectively displaying inscriptions as to the services rendered to the institution in the past by the late Mr. Edward Martin and Dr. Gourlay, when connected with the medical staff of the hospital. The exterior of this ornamental bay is in the simple Gothic style characteristic of the rest of the building, but is constructed with a view to being specially in harmony with the new wing,—in the upper portion of which is the recently-opened women's ward, whilst the lower is the lately-provided out-patients' department,—at the north side of the building. The smaller ward is at the northern end of the larger, and, formed by the division of a room formerly used as a nurses' room, is for children's cases requiring special attention. The extension southward of the larger room is somewhat loftier than the remainder of the apartment. The total cost of the alterations which have brought the children's wards into being will be about 400*l.*, exclusive of furnishing. Mr. James Wilcox has executed everything except the laying of the paraffin flooring, which was carried out by Mr. Arthur Jennings, of London. The architects for the work were Messrs. Price & Wooler. It may be mentioned that, in connexion with the formation of the children's wards, a porch has been erected on the south side of the building for admission to the corridors.

The Student's Column.

IRON.

III.—THE BLAST FURNACE.

THE furnace is filled to a certain height with fuel, and when sufficient heat is attained, ore mixed with flux is introduced from the top. The furnace must be allowed to become gradually hot, as a sudden application of a high temperature might cause the lining of the furnace to crack. When once lighted the furnace is not allowed to go out, until it requires repair, but fresh supplies are continually added at the top as the materials sink down in the process of smelting. The hot blast possesses the merit of producing a less cooling effect upon the fire, and of economising the fuel. In Budd's hot-blast furnace, air is heated to 600° Fahr., and the use of uncoked coal is allowed.

In cold-blast furnaces you must use coke. The blast when coke is used is 3 lb. per sq. inch, and when anthracite is employed, 5 lb. or 6 lb. The tuyeres through which the blast of air is forced into the furnace are formed of conical tubes of cast-iron, having double walls, between which water is introduced, and made to circulate in order to prevent their becoming melted.

It was at first supposed that the hot-blast system possessed the disadvantage of reducing the impurities in the ore too rapidly to a molten state, and that in consequence they were run out in the metal, thus producing an inferior sample of iron, but it has since been proved that the temperature of the blast has in itself very little effect upon the metal, so that with due attention to details in working and in the application of the blast we can obtain an iron of as good a character from a hot-blast as from a cold-blast furnace. There are but few cold-blast furnaces now existing in the country.

Gangue is a general term for the clay or other earthy impurities found in the ore. Flux is a term applied to any substance added to an ore to liquify the earthy portion or the gangue at a high temperature. Lime is found to be the best flux for clay, which, being a silicate of alumina, is practically an infusible substance by itself. Though infusible when heated alone, the lime acts as a flux upon the clay of the ore; the two melt and form a rough kind of glass or slag, which may be considered a double silicate of alumina and lime. Hence, limestone is employed as a flux with clay ironstone.

When the furnace is intensely heated, the iron mixed with the earthy matter of the ore sinks down into the hotter regions of the furnace, then the flux exercises its influence over the gangue, separation ensues, and the

lighter and more fusible impurities float on the top in the form of slag. The reduced metal being heavier, collects beneath the slag, forming molten cast-iron, which is run first into crucibles, and afterwards into long channels formed at intervals in the sand of the floor of the foundry, having branches upon each side, called the sow and her pigs, hence the name "pig-iron."

The slag which collects upon the surface of the melted iron in the furnace flows out at an opening left for the purpose on a higher level, and the melted iron is never permitted to rise to the level of this opening, but is run out as often as necessary through a tap-hole, at the bottom of the crucible, which is rammed up again with binding sand. The pigs are formed of about 3 ft. in length, 4 in. diameter, and though rough, are now in a marketable condition.

Yorkshire yields the best iron for bars and boiler plates. Cumberland for steel iron. Staffordshire for ordinary bar iron. Wales produces chiefly rails. Scotland, the most cast-iron. For wide and difficult sections, Belgian iron is sometimes recommended upon account of its peculiarly plastic nature.

Books.

Die Akropolis von Athen nach den Berichten der Alten und den neuesten Erforschungen. VON ADOLF BOETTICHER. Mit 132 Text figuren und 36 Tafeln. Berlin: Verlag von Julius Springer. 1888.

DR. BÖTTICHER'S popular book on the excavations of Olympia ran speedily, as we had occasion to note, into a second edition. The welcome extended to it both at home and abroad has induced him to prepare this other and similar book on the Acropolis. There was room for it. Wachsmuth's work, "Die Stadt Athen," leaves little to undo, but published as it was in 1873, much to add. Since its appearance the labours of a host of discoverers, more especially of Michaelis, Koehler, Milchhoeffer, and Dörpfeld have added much matter of fact, and still more of probable hypothesis. Nor could Wachsmuth's book ever be regarded as popular. Dr. Bötticher aims always at being intelligible to the ordinary educated person, and also at a most helpful liberal system of illustration. Not only are all the important sculptures figured, but plans, restorations, sections, &c., abound. Our only regret is that what seems to us a quite disproportionate space is occupied by a detailed architectural and sculptural account of the Parthenon. The Parthenon is undoubtedly of supreme importance, but information about it is easily accessible in every handbook of sculpture and every popular guide. We should have liked less of it, and more,—say of the Asklepieion. The book is divided into three sections,—the Acropolis to the time of Cimon; the Acropolis under Pericles; the Acropolis from Pericles to Roman times; and the whole is preceded by a good account of what may be called the "modern history" of Athens. It is much to be wished that Dr. Bötticher will bring out a continuation volume, dealing with the City of the Plain, the Agora, the district of the Ilissus. There is ample though less sensational material for even a popular book. It is still more to be wished that we had anything like such an adequate *resumé* in English. We have had nothing since the second edition of Dr. Dyer's Athens in 1873.

Sewage Treatment: Purification and Utilisation. By J. W. SLATER, F.E.S. London: Whittaker & Co.

THE remark of the author that there is no process of sewage treatment which is universally applicable is hardly worthy of one who knows so much about the treatment of sewage as Mr. Slater evidently does. The remark is stale, and is, indeed, a "gratuitous truism," to use his own words, p. 85, concerning another matter. There is, however, one cardinal point always to be kept in view by those who treat sewage, in whatever manner, viz., that it should go to the land, and we are glad to see that the author strongly enforces the necessity of this being done. He does not, indeed, approve of any of the modes of treatment or utilisation hitherto adopted, whether of irrigation, filtration, simple subsidence, precipitation with lime, or discharge into the sea or a tidal river without any treatment; but under a satisfactory process he would still convey it to the land as manure, after discharging elsewhere the mere water it contains. He says that if a population consumes the produce without returning to the soil the sewage, or whatever is of manurial value, in it, the soil will ultimately become exhausted; but that if we make a full and due return,—if we give back to the land all the residues and waste of the crops which have grown upon it, and all the excrements, liquid and solid, of the animals which have directly or indirectly been fed upon such crops,—the land will remain substantially at its original point of fertility. In England the restitution has been very incomplete, because the excretions of the human inhabitants have not been brought back to the soil. The deficiency has been made good by importing manure from abroad, but countries which formerly exported certain manures to England have now ceased to do so, the home demand having so far raised the price that the transaction is no longer profitable. Ultimately, every country will be driven back upon its own soil for support, and the bearing of this truth upon the question of sewage-disposal is evident. Will it, the author asks, in the coming time, be at all practicable to go on wasting the excreta of our urban population, as we are now in most cases still doing? Shall we not want it to keep up the fertility of our own lands against the time when the foreign supply, both of food and manure, begins to show a marked decline? It is commonly said that the money spent in making sewage manures is not well laid out, and that plant food might be had at a less cost from other sources. *For the present*, the author emphatically says, this may be true; but we must still purify the sewage, on sanitary grounds, and the question is, therefore, whether we shall do this wastefully or whether we shall not recover at least a part of our outlay in the form of manure? We have, then, here a distinct recognition by the author of the important principle that the sewage should go to the land, but when we look for the means by which that is to be done we find the effect of the book, on the whole, to be to show how difficult it is to treat sewage in any manner whatever satisfactorily. The author goes through all the processes hitherto adopted,—simple subsidence, filtration, irrigation, deodorisation, precipitation,—and enumerates the difficulties of all, and the utter absurdity of some of them. He points out that there is a difference in the constitution of sewage of different towns, whether they be residential or manufacturing towns, and that certainly is so to some small extent, but it is not a sufficient difference anywhere to require a different system of treatment on that account. The local circumstances which make different systems of treatment advisable in different places lie outside the constitution of the sewage itself. The author complains much, and very justly, of the inherent difficulty of sewage treatment being increased by so large a quantity of mud from the roads being discharged into the sewers, especially in towns where the streets have been metalled according to "the iniquity of Macadam." This road-dirt, harmless in itself, is rendered offensive by contact with the sewage, with which each grain becomes coated, and very offensive wherever it may ultimately be found.

The question is asked, what is meant by a "nuisance," and injury therefrom such as the pollution of a river, and a case is quoted when a Judge said "it is sufficient if it render the water offensive or disagreeable to the taste or smell."

The author's definition of a nuisance is wider than the usual one. He would include any matter, whether solid, liquid, or gaseous which may become injurious to health by contact with other substances, whether these be in themselves hurtful or not; and, further, any matter which, though not demonstrably hurtful, is offensive to the senses. If this, we may say, had been the law on the subject during the last thirty years, a vast deal of useful sanitary work could have been done in towns, both large and small, which has remained undone because the nuisances which were evidently injurious, by a common-sense test, could not be proved in a court of law to have hitherto poisoned anybody.

With regard to the main drift of the book it is clearly that the treatment of sewage in tanks with chemicals is preferable to any other system. We should infer from what he says that the author has had much more experience in this system than in that of irrigation or the application of liquid sewage to land in any way. His objection to sewage being applied to land is that "If water is allowed to flow, however gently, over the surface of dry soil, bubbles of air form and burst. Thus, whenever sewage is turned on to land which has not been kept constantly damp, disease germs will be carried into the air, just as in the case of bubbles which form on a polluted river." This is curious, that the action should be the same whether the soil from which the bubbles are disengaged should be soaked, as at the bottom of a river, or dry, as in land freshly irrigated with sewage. That germs do float about in the air has been proved, but a better explanation of how they come there than that they are carried into it by bubbles is that when the liquid containing them has flowed over the ground, which afterwards becomes dry for want of a continuous supply, the germs may under certain circumstances be blown about by the wind; but we regard even that as being an imaginary rather than an actual occurrence. If a chemist, given to the tank system of treatment of sewage, finds a germ in the air near an irrigated field, he supposes it to have arisen from that particular field. It may, however, have been in the air over the field before the sewage was brought to it.

But the author seems to have quite as much objection to the tank system, as it is mostly carried on, as to irrigation. All substances (used in tanks for the precipitation of sludge from sewage) are objectionable which yield an alkaline effluent, as lime does. Sulphate of alumina is probably one of the least desirable forms in which alumina can be introduced in the treatment of sewage. On no account should any soluble sulphide, or anything which may form such a sulphide, be allowed to pass into a river. Chloride of lime and the corresponding magnesia and soda compounds must also be excluded. Common salt has been used with no definite advantage. And so on, with many other substances which have been either adopted or proposed.

Of the substances which are more or less free from objection, the foremost are said to be the salts of aluminium, and the best of these is the hydrated chloride, familiarly called the muriate of alumina, and with this is to be used finely-divided clay. Alum and clay, it will be remembered, are the two chief constituents of the mixture in the A B C process, and with regard to this process we do not see that the author anywhere speaks unfavourably of it, although very much so of nearly all others. Of the system of disposal of the sewage of London, the author does not approve; he calls it Bazalgettism,—that is, the system of discharge directly into the sea or a tidal river at the time of ebb, without any treatment at all.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

14,142, Wood Pavements. H. Freere.

According to this invention, the blocks are formed with holes, and nails, pins, wires, or dowels are used for fixing. The blocks are formed into plates or squares of suitable size, and these plates have their sides formed tooth-like so as to bind the separate plates together.

357, Hangers and Holdfasts, &c. J. Gregson.

The bottom of the hanger made according to this invention is bent in L form, and is provided with a number of holes to compensate for the varying lengths or depths of joints in brick or stone walls. The upper end of the hanger is provided with holes which allow them to pass over the head of the nail or holdfast. These holes are connected on their upper side with slots slightly larger than the body or shank of the nail or holdfast, the hanger being secured by dropping the slots on to the nail or holdfast. The nails are provided with a body or shank with a circular or other distance-piece against which the pipe or article to be secured is placed and then fastened by placing an open-sided washer in a slot or recess at the outer end of the body or shank, the washer being compressed with a pair of nippers.

1,927, Decorating Walls and Ceilings. R. Scott.

For the purposes of this invention kamptulicon or linoleum is employed, and these, treated with gelatine and passed while wet between rollers and dusted with metallic particles, forms the basis of the new decorative substance. Water-glass is used for binding and protecting the deposited particles.

1,943, Glazing for Roof. H. E. Peach.

By this invention, expansion and contraction bars,

either of metal or wood, are placed along the edges of the panels of glass, and are filled with putty; space is left between for expansion. The new form of bar may be secured to any ordinary skylight sash-bar, either of wood or metal, by means of screws or bolts passing through metal cappings.

2,590, Roofing Tiles. E. Y. Poole.

To prevent stripping by wind or the admission of rain or snow under the tiles, front and back fillets are, by this invention, placed to protect the lap. To prevent the water lodging at the back of the front fillet running across the tile, small openings are made, protected by raised ornaments. The tile is fastened by bending a strong piece of wire into the form of a square crook having one limb longer than the other. The long limb is passed down through the lower hole and through a hole in the upper part of the lower tile, the small limb going into the second hole; the long limb is then bent round the under side of the batten and thoroughly secures the tile.

4,544, Metallic Sashes and Frames. J. I. Williams.

This invention is chiefly designed to prevent the penetration of rain through the window. The glazing fillet is also fixed in such a manner that there are no external screw-holes therein, while the fillet can adjust its position to varying thicknesses of glass. A rectangular hollow space is enclosed between the frame and the sash.

8,786, Graining Wood. J. Watson.

According to this invention, the stencil is so cast that a raised edging is formed round the cut-out pattern of the grain, and this edge only touches the work. The stencil is made in thin brass, and the pattern is to be laid over in the ordinary way, and the exposed parts wiped out with a clean rag.

NEW APPLICATIONS FOR PATENTS.

Jan. 6.—252, W. Green, Hydraulic Lifts.

Jan. 7.—284, M. Adams, Floor Tiles.—326, M. Blanchard, Terra-cotta Fireproof Construction.

Jan. 9.—331, H. McKibbin, Window Frames or Sashes.—334, H. Morgan, Attaching Sashboards to Window-sashes, &c.

Jan. 10.—372, W. Gibbs, Lead Glazing.—373, G. Pratt, Water-closet and Urinal Flusher.—381, H. Romain, Draught-preventer for Doors.—417, J. Darby, Burning Lime, Cement, &c.

Jan. 11.—444, J. Hall, Fire-brick Register Grate Backs.—446 and 451, J. Cochrane, Preventing Waste of Water in Cisterns for Supplying of Water-closets.

Jan. 12.—482, T. Grimbleby, Roofing Tiles.—494, J. Hilton, Fireproofing Buildings.—495, S. & T. Cooper, Roofing Felt.—520, G. Verini, Chimney Pots, &c.—521, W. Wade, Doors and similar Structures formed with a Framework of Wood.

PROVISIONAL SPECIFICATIONS ACCEPTED.

13,342, R. Platt, Window Sash-fastener.—16,506 F. Collins, Sash-fasteners.—16,512, B. Clarke, jun., Automatic Grip Handle and Lock or Latch for Doors, Casements, &c.—16,593, E. Thorp, Balancing and Holding the Sashes of Sliding Windows.—16,814, G. Parkinson and G. Wickham, Siphon Flushing Tanks or Cisterns.—16,819, T. Pease, Door or Gate Hinge.—16,916, G. Smith, Disinfecting Water-closets.—16,927, F. T. Ford, Hydraulic Lifts.—17,009, J. Garvie, jun., Steam Pile-drivers.—17,179, H. Frost, Flushing Cisterns and Water-waste Preventers.—17,556, H. Stockman, Ventilators.—17,588, H. Ball, Opening and Closing Fanlights, &c.—17,777, G. Otley, Sweeping and Prevention of Fouling of Chimneys.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

2,300, R. Pyne, Window Fasteners, &c.—3,634, C. Archer, Hydraulic Lifts.—7,381, J. Dudley and J. Hamilton, Concrete and Artificial Stone Mantelpieces.—7,808, L. Sauter, Screws and Screw-drivers.—15,906, W. Thompson, Brick Machines.—16,930, W. Thompson, Construction of Floors, Roofs, Ceilings, &c., and in T or connecting pieces therefor.—16,931, J. Gowland, Chimney-tops or Cowls.—16,965, S. Nicholls, Syphon Water-waste Preventers.—17,020, J. Dallas, Burglar Alarms.—17,121, J. Lister, Sash Locks.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

JANUARY 10.

By DEBENHAM, TEWSON, & Co.

Minories—10 and 11, Vine-street, City, leaseholds.. £1,000

By E. J. GAIRDNER.

Tottenham Court-road—No. 90; and No. 3, Howland-mews East, term 41 years..... 425

JANUARY 11.

By WALKER & RUNTZ.

Whitechapel, Boar's Head-yard—A plot of freehold land, area 85 ft. 87

JANUARY 12.

By A. WALTON.

Tottenham Court-road—"The Soltire" Coffee Palace, 53 years, ground-rent 70*l.* 500

By NEWBON & HARDING.

Hoxton—124 to 130 even, Prevost-street, 14 years, ground-rent 14*l.* 180

Islington—5, Popham-street, freehold 180

By WILKINSON & SON.

(At Brighton.)

Brighton—12, Preston-road, freehold 1,000

5, Beaconsfield-road, freehold 590

MEETINGS.

MONDAY, JANUARY 23.

Royal Institute of British Architects. — Mr. J. M. Brydon on "Architectural Competitions and the Methods of their Decision." (Business Meeting for Members only.) 8 p.m.

Royal Academy (*Lectures in Architecture*).—Professor Aitchison, A.R.A., on "The History of Architecture," I. 8 p.m.

Surveyors' Institution. — Mr. R. F. Grantham on "Water Supply, with Special Reference to Villages and Country Mansions." 8 p.m.

TUESDAY, JANUARY 24.

Institution of Civil Engineers.—Sir Bradford Leslie, K.C.I.E., on "The Erection of the 'Jubilee' Bridge carrying the East Indian Railway over the River Hooghly, at Hooghly." 8 p.m.

Manchester Architectural Association. — Mr. G. E. Statham on "Notes on Building Stones." 7·30 p.m.

WEDNESDAY, JANUARY 25.

Society of Arts.—Mr. Walter Emden on "Theatres and Fireproof Construction." 8 p.m.

Liverpool Engineering Society.—Further discussion on Mr. A. W. Brightmore's paper on "Some recent Experiments on Iron and Steel Rivetted Joints." 8 p.m.

THURSDAY, JANUARY 26.

Royal Academy (*Lectures in Architecture*).—Professor Aitchison, A.R.A., on "The History of Architecture," II. 8 p.m.

London Institution.—Mr. H. H. Statham on "Architectural Mouldings." 6 p.m.

Royal Institution.—Mr. H. Herkomer, M.A., A.R.A., on "A Visit to America." 3 p.m.

Society of Telegraph-Engineers and Electricians.—Discussion on Mr. A. C. Cockburn's paper on "Safety Fuses for Electric Light Circuits and on the Behaviour of the various Metals usually employed in their Construction." 8 p.m.

Society for Preserving Memorials of the Dead.—Mr. J. Lewis André on "The Union of Sepulchral with Religious and Allegorical Art." 4 p.m.

Society of Antiquaries.—8.30 p.m.

Edinburgh Architectural Association. — Mr. A. Macpherson on "Some Elements of Design." 8 p.m.

FRIDAY, JANUARY 27.

Society of Arts (*Indian Section*).—Mr. Justice Cunningham on "The Public Health in India." 8 p.m.

Institution of Civil Engineers (*Students' Meeting*). — Mr. Lawrence Gibbs on "Pumping-Machinery in the Fenland and by the Trentside." 7·30 p.m.

Miscellanea.

The Wood Trade in 1887.—Messrs. Foy, Morgan, & Co.'s "Annual Wood Report, 1887," just issued, says:—"The past year has proved somewhat more satisfactory to the wood trade than those immediately preceding it. Prices have ruled low, and have undergone but few fluctuations, and though but little margin existed between f.o.b. cost and spot figures, low freights and a steady though moderate demand have enabled importers to do a fair business with greater immunity from bad debts than for some time past. Owing to the substantial rise in freights in the autumn inducing holders to allow their goods to winter on the other side, the dock stocks show a very favourable state of things. The stock of Baltic deals at the public docks is now 30 per cent. less than in January last, and there is good reason to believe that the quantity at mills and yards is less than at that time. This shortage, therefore, of 22,000 standards in Baltic goods is a great factor for an improvement in price, and the rise which has taken place during the last two months has so far been entirely caused by the smallness of the stocks, and not by an increase in the demand; should there, however, be anything like a revival in the building and kindred trades, there is no reason to doubt that a further advance must follow. Auctions have been small, and the limited quantity of Swedish goods of the best brands disposed of by this means have been very noticeable. As the import of floorings from Sweden increases, so that from Norway decreases, and the growing scarcity of convertible trees near the principal rivers makes the future of Norway flooring very doubtful, unless the shippers can depend with more certainty than hitherto on the colonial markets. The supply of battens has been quite large enough for the demand. Balks sold fairly during the autumn when square and good, but lately there were rather too many arrivals. The smallness of the supply of pitch pine is one of the features of the year's trade. The import was only fifteen cargoes, inclusive of two small parcels. The various large works on hand having used up the heavy stocks of timber remaining of the preceding year's import, prices have been getting firmer, and had it not been for the Queenborough stocks do doubt they would be much higher now. C.I.F. quotations are advancing, and there is a prospect of better figures."

Cheadle Railway, Mineral, and Land Company (Limited).—The prospectus of the issue of 6 per cent. mortgage debentures in this company will be found in our advertising columns.

Rotating Firegrates.—Our contemporary *Invention* having stated, in its issue of the 7th inst., that "a patent for domestic firegrates has been taken out by Mr. W. H. H. Marten, the object of which is, curiously enough, to provide a double grate capable of being rotated, enabling each of the grates to be utilised for either of the rooms in which they are placed, and, assuming there is a fire in only one of the grates, permitting such grate to be turned from one room to the other when desirable," a correspondent of the journal in question writes to say that "the same description of stove was in use fifty-eight years since, in the house of a relative in Queen's-square, who had a most valuable library of very choice books. In order to keep the books free from dust, the grates all rotated, being filled and lit in another room. When well burnt-up and clear they were turned into the library, and never touched whilst there. To be stirred or replenished they were turned into the second room, bringing by the same operation a clear bright fire into the library." Truly, as the correspondent says, there is nothing new; but he does not say how long such grates were in use, and whether they were found to be satisfactory in the long run.

The Health of London in 1887.—Measured by its recorded death-rate, London was healthier in 1887 than in any year on record. The mean annual death-rate in London during the four quarters of last year was 19·6 per 1,000, against 19·8 and 19·9 in the two preceding years, while in no year prior to 1885 was the London death-rate below 20·5. During the first seven years of the current decennium, 1881-90, the mean annual death-rate in London did not exceed 20·4 per 1,000, whereas in the four preceding decennia of civil registration the death-rate ranged from 24·8 in 1841-50 to 22·5 in 1871-80. These figures speak eloquently of sanitary progress in London; while the still wide range of death-rates in the various sanitary districts of the metropolis conclusively prove that we have, at present, far from reached the lowest attainable death-rate for London. We shall have occasion to refer to this question of metropolitan local death-rates. It may be well to point out that the mean death-rate in 1887 in the aggregate of the twenty-eight large English towns dealt with by the Registrar-General in his weekly return was 20·8 per 1,000, against 19·6 in London. But to refer to London, the death-rate last year from what are known as the principal zymotic diseases was equal to 3·02 per 1,000, against 2·69 in 1886. This increase in the zymotic mortality in London last year was practically shared between measles and scarlet fever.—*Lancet.*

Sanitary Specialities.—Messrs. Adams & Co., sanitary engineers, York, send us an illustrated catalogue of their specialities, some of which are well worth attention by architects, engineers, borough surveyors, builders, and house-owners. Their patent latrine, with continuous flushing system, appears to be well adapted for use on cottage property where "back-drainage" is sanctioned. The flushing is automatic, as is also the case with their trough flushing closet, the latter being very suitable for use in schools, barracks, workshops, &c. The trough has such a cross section as to prevent the soiling of the back. Other items specially worth attention, to name only two out of several, are the "combination grease-trap and flush-tank," and the "improved automatic flushing siphon" for flushing sewers. Traps and gullies, water-closets and urinals, sanitary iron-work, sewer ventilators, and water-fittings, go to make up the remainder of the items of what will be found to be a very useful though far from bulky catalogue.

The Property Market.—Although the sales at the London Auction Mart during the year just closed have not been quite so numerous as in 1886, the decrease has not been very marked, for the totals for 1887 stand at 3,989,099*l.* as against 4,120,044*l.*, a difference of about 180,000*l.* There has, however, been a steady fall in the amount of the receipts from sales at the Mart for the last ten years. In the years 1884 and 1885, 5,976,931*l.* and 4,453,378*l.* respectively represented the amount of the transactions. Referring to our files and contrasting the figures for 1887 with those for 1877 we find that the difference is no less than 7,749,783, an enormous decline, indicating in the clearest possible manner the depressed state of the English land and property market.—*Estates Gazette.*

Building in Sheffield in 1887.—Mr. W. C. Fenton, Building Surveyor to the Corporation, has presented to the Highway Committee his fifth annual report of the work done in connexion with his department. He says:—"Plans have been approved for the erection of 928 houses and 139 other buildings, as compared with 1,261 houses and 162 other buildings in 1886, being a decrease of 333 houses and 23 other buildings on the previous year. While there has been a decrease in the number of proposed buildings, the number actually built shows a large increase on 1886. The number of houses certified as completed and fit for human habitation is 928, as compared with 725 in 1886, being an increase of 203. This is the largest number of houses erected in any one year since 1880. The number of other buildings completed is 98, as compared with 128 in 1886, being a decrease of 30. The net increase of all kinds of buildings on 1886 is 173. Last year there was a net increase on 1885 of three only. Thirteen new buildings, as compared with 16 in 1886, have been certified as to their means of ingress and egress, in accordance with Section 87 of the Sheffield Corporation Act of 1883. During the year 1887 I have on 214 days made 3,486 visits to individual lots of property, as compared with 2,825 visits on 172 days in 1886, the average being about the same, over 16 per diem. I have examined 53 buildings, as compared with 21 in 1886, said to be in a dangerous or ruinous condition. Proceedings have been ordered to be taken in three cases. In two cases convictions were obtained (as compared with one case in 1886), and one has not yet been heard. Since the present by-laws came into force (in 1864) 20,227 houses have been certified as completed and fit for human habitation."

Liverpool Engineering Society.—The opening meeting of the present session of this Society was held at the Royal Institution, Colquitt-street, on the 11th inst., Mr. Charles H. Darbishire, Assoc. M. Inst. C.E., President, in the chair. Upon taking the chair, the President delivered a short address to the meeting. Mr. A. W. Brightmore, M. Sc., then read a paper entitled "Some Recent Experiments on Iron and Steel and Riveted Joints." Mr. Brightmore reviewed the important series of experiments carried out at the instance of the Prussian Government by Wöhler and Bauschinger. He showed how these experiments pointed to the conclusion that, when the nature of the stresses in the members of any structure is subject to continual reversal, the maximum load consistent with the permanency of that structure is not more than one-third of what may with perfect safety be borne when the nature and amount of the stresses remain constant. He then considered the effect of different kinds of loading upon the elasticity of iron and steel. Proceeding to the consideration of riveted joints, he dwelt upon the principles that guide their design, and concluded by demonstrating the advantages of machine over hand-riveted joints. The reading of the paper was followed by an animated discussion, which was prolonged to such an extent that it was finally resolved to further consider the matter at the next meeting.

American Railway Construction in 1887.—It has now been established by carefully-prepared statistics that the new mileage of railway added in 1887 to the lines of the United States reaches the enormous total of 12,724. The total mileage of American railways is at present 151,000, against 137,986 miles at the beginning of 1887. The new mileage added is the largest in any year in the United States, or, indeed, in any country, and is approached only by that for 1882, when 11,568 miles were added. Of the several states, the largest totals are furnished by Kansas, 2,070 miles; Nebraska, 1,101 miles; Texas, 1,055 miles; Colorado, 818 miles; Dakota, 760 miles; Michigan, 700 miles; Montana, 616 miles; Missouri, 554 miles; Alabama, 515 miles; the Indian Territory, 499 miles; all but two of the largest contributors being either north-western or south-western states, those two groups furnishing 8,307 miles out of the entire total. It is not likely that the current year will witness any approach to the record of 1887, and some estimates put the probable figure for 1888 as low as 6,000 miles. The lower cost of steel rails (they are now $31 and $32 a ton, against $39 and $40 at the beginning of 1887) may give some encouragement to a continuation of construction.

Higher Grade Board Schools at Bolton. On the 9th inst., on the resumption of term after the Christmas holidays, a large higher grade Board school, which has just been erected at Bolton, was opened for the reception of children who have passed the third standard. In addition to branches of ordinary elementary education, the school is intended to be used for experimental demonstrations in science, having a laboratory with accommodation for a large number of students. The style of architecture adopted is that known as "Queen Anne." The building, which is three stories in height, has a main frontage of 104 ft., and occupies an area of upwards of 4,000 ft., in addition to the play and recreation grounds. It is faced with local red pressed brick, Ruabon terra cotta being used for the moulded and ornamental work, and Yorkshire stone for window sills, heads, and strings, whilst the principal entrance, doorways, and other portions of the frontages, have been enriched with carved stone and brickwork. The floors are of iron and concrete, overlaid with teak boarding. The staircases have Hawksley's patent treads. Internally the building is arranged on the class-room principle. Three of these class-rooms are on the ground-floor, and three others on the second-floor, whilst on the upper floor is another large class-room, together with a lecture-hall capable of seating 100 students, and intended also to be used for experimental demonstrations in science. Immediately adjoining is the laboratory, with accommodation for forty-eight students working at the same time. The schools have been erected from the designs of Mr. Jonathan Simpson, architect, of Bolton, Messrs. J. H. and G. Marsden, of Bolton, being the builders. Mr. D. Walsh has acted as clerk of works.

Captain Shaw and the London Theatres. At the meeting of the Paddington Vestry on Tuesday last, Mr. Mark H. Judge asked the representatives of the parish at the Metropolitan Board of Works the reason that induced the Metropolitan Board of Works to continue to suppress Captain Shaw's report of 1882, in which he dwelt exhaustively with the condition of the London theatres.—Mr. T. G. Fardell, the senior representative of the parish at the Board of Works, said that the report was not made public for two reasons, first, in order not to unnecessarily alarm the public; and secondly, not to injure the lessees of the theatres. It was not advisable to publish broadcast defects in theatres which the board had not power to remedy.—Mr. Mark Judge then proposed "That the Metropolitan Board of Works be informed that in the opinion of this Vestry the Report of Captain Shaw on the London Theatres, printed for the private information of the members of the Board of Works in 1882, ought to be made public without further delay."—Mr. H. H. Collins said it was only by arousing public opinion upon the subject that they could hope to have theatres properly constructed, and as the publication of that report would tend to this end, he seconded the proposition.—Mr. Fardell hoped the meeting would not agree to this, because as the report was obsolete, the publication would do no good, for since 1882 various improvements had been made, and the defects then apparent had been to a certain extent remedied, and the report would now convey an erroneous impression to the public as to the present condition of the London theatres.—Mr. H. H. Myers said the report would prove of more harm than good, for it would create an unnecessary panic.—Mr. Judge contended that the report was not obsolete, and its publication, in addition, was demanded by the ratepayers of London.—The proposition was eventually negatived by the Vestry.

Tenders from British Firms for Italian Railways.—The subjoined has been issued from the Foreign Office: "With reference to the paragraph in the newspapers of the 11th ult., information has been received from her Majesty's Ambassador at Rome that hitherto no firms or railway companies have been invited to compete for the construction of the new railway lines between Reggio and Eboli, and Messina and Carden. The Italian Minister for Public works will be happy to receive tenders from British firms, provided that the names of such firms be notified through her Majesty's Embassy. All tenders should be limited to offers for the construction only, and not for the working of the lines; and in case of acceptance a deposit of money will be exacted."

The Tin-plate Trade.—Messrs. Arthur Bird & Co., in their annual circular, say:—"During the greater part of the past year the tinplate works in this country had, in common with all other iron and allied industries, great difficulty in obtaining remunerative prices for their manufactures. For about nine months, prices of raw material ruled comparatively high, demand was exceptionally sluggish, and prices realised showed little or no profit to the producer. The statistical position of the trade in January, 1887, as shown in our circular of that date, gave promise of better things, and as a matter of fact cokes which then stood at the ruinous price of 12s. 9d. did somewhat improve to 13s. 9d., but consumers and dealers continued chary of buying anything beyond immediate and pressing requirements, and the market kept dull and lifeless. During the last month or so, the important advance in the price of foreign tin had its effect upon the value of tinplates, and the trade for a short time showed more vitality and activity than for some years past. However, beyond raising the price to correspond with the enhanced value of metal, the makers have felt but little benefit at present, consumers still refusing to buy beyond their current requirements and dealers declining to lay in stock. As foreign tin may now be considered to be at its maximum figure, the price of tinplates will probably not be further affected by it, at all events, in an upward direction; producers must now depend more upon demand overtaking supply or an advance in the price of iron and steel."

Obituary.—We regret to hear of the death, after a few days' illness, of Mr. William Brass, the builder, well-known in the City as "Mr. Deputy Brass," of Silver-street and Old-street. The *City Press* says that the deceased, who died at his residence, the Elms, Leigham Court-road, Streatham, was the son of Mr. William Brass, of Cripplegate, and was born on February 7th, 1813. His father was for upwards of thirty-two years a member of the Court of Common Council, and before his retirement the late deputy was elected to a seat, the connexion which now ceases having lasted without a break for a period of more than sixty years. During his long term of service in the Court Mr. Brass had acted on the majority of the Corporation Committees, over the deliberations of two of which, the Bridge House and the Coal, Corn, and Finance, he had at different times the honour of presiding. He leaves a family of three sons and two daughters.

Society of Engineers.—The following gentlemen have been elected, during the past year, Members of the Society of Engineers, viz.:—Messrs. P. F. Tarbutt, W. Porteous, C. N. Lailey, J. Reed, J. Sturgeon, E. Olander, C. W. Smith, W. V. Watson, R. F. Castellari, S. Griffin, A. H. Baylis, J. Styles, J. Parker, W. H. Lindsay, J. W. Peggs, J. Kerr, H. W. Wilkinson, R. Lindsley, D. McCulloch, J. Jackson, G. H. Holden, J. C. B. P. Seaver, H. H. Lake, C. Jobson, J. Blackburn, W. Snelgrove, and J. T. Lewis; and as Associates: E. L. W. Haskett-Smith, W. B. Fullwood, P. J. Dawson, E. C. S. Hogan, F. P. Lane, A. P. J. Stourton, C. F. Smith, E. F. Harris, J. B. Hutchins, H. A. F. Musgrave, A. F. Evans, and H. R. Newton.

Clocks and Bells.—A large "Jubilee memorial" clock has just been completed at Goldington, near Bedford. It strikes the hours, and shows time on one large dial. Messrs. John Smith and Sons, of the Midland Clock Works, Derby, carried out the work. The same firm are also making the large Jubilee memorial clock at Gravesend. By the same makers a large clock and chimes have just been erected in the Church Tower at Mayfield, Sussex. The clock is fitted with all the latest improvements, and the hours are struck with a 60-lb. hammer. It has a double three-legged gravity escapement and a very heavy compensated pendulum. Messrs. Smith have just completed a similar clock at Myland Church, near Colchester.

Douglas (Isle of Man).—The Douglas School Board is about to erect new schools in the three departments, to accommodate 830 children, on a site fronting Barrack-street. The block of buildings, which will be three stories in height, includes cookery class-room and manual class-room, and also Board-room. The designs are under the joint authorship of Mr. Alex. Bleakley, A.R.I.B.A., and Mr. Thomas W. Cubbon, architects, of Birkenhead and Douglas, whose plans were selected in public competition, and under whose superintendence the work has been carried out.

Registration of Plumbers in Glasgow. On the 9th inst. a public meeting of master and operative plumbers and others interested in the movement for the registration of the plumbers of Glasgow and the West of Scotland, in connexion with the Worshipful Company of Plumbers, London, was held in the Trades' Hall, Glassford-street. Sir James King, Lord Provost, occupied the chair. Councillor Smith moved:—

"That this meeting of the master and operative plumbers in Glasgow and the West of Scotland, having heard statements made by Mr. Shaw and Mr. Coles respecting the action of the Worshipful Company of Plumbers, London, with the view of bringing about a national system of registration of plumbers, approves of such a system of registration, and resolves (1) that a District Council for Glasgow and the West of Scotland, in union with the London Plumbers' Company, be formed to carry out such a system for that district; and (2) that such District Council shall consist of representatives from the master plumbers, the operatives, and the public."

Dr. Duncan seconded the resolution, which was supported by Mr. David Thomson and Mr. John Honeyman, and unanimously agreed to. Mr. Alex. Brown moved, and Mr. Cairns seconded, the appointment of the following master plumbers as members of the District Council:—Messrs. Wm. Connal, Wm. Cairns, William Anderson, John Speirs, J. P. Buchan, James Anderson, George Carrick, John Bryce, W. L. Arnot, John M'Feat, Alex. Brown, Wm. Rattray, Col. Turner, and Charles Cameron. The motion was adopted. On the motion of Mr. Francis McCulloch, seconded by Mr. James Dickie, the following operative plumbers were appointed members of the District Council:—Messrs. Jno. Wilson, Simon Fraser, Wm. Cherry, James Dickie, John Gardner, George M'Bean, John M'Callum, Francis M'Culloch, James Murphy, Antonio Riva, John Nicolson, John M'Queen, James Berwick, and Thomas Ewing. On the motion of Mr. W. P. Buchan, seconded by Mr. A. W. Rattray, the following gentlemen were appointed to represent the public on the Council:—Sir James King, Lord Provost; Sir J. N. Cuthbertson, Dr. J. B. Russell, Dr. Wm. Wallace, Dr. W. E. Duncan, Mr. Peter Fyfe, Professor Jamieson, Councillor Smith; Messrs. James M. Gale, David Thomson, James Sellars, James Thomson, John Honeyman, and A. M. Scott. Another resolution was passed empowering the District Council to frame rules for carrying on the movement.

PRICES CURRENT OF MATERIALS.

TIMBER.	£. s. d.	£. s. d.
Greenheart, B.G. ....ton	6 10 0	7 15 0
Teak, E.I. ....load	8 0 0	12 10 0
Sequoia, U.S. ....foot cube	0 2 3	0 3 0
Ash, Canada ....load	3 0 0	4 10 0
Birch ,, ...	2 0 0	3 10 0
Elm ,, ...	3 10 0	4 10 0
Fir, Dantsic, &c.	1 10 0	4 0 0
Oak ,, ...	2 10 0	4 10 0
Canada	3 0 0	6 0 0
Pine, Canada red	2 0 0	3 10 0
,, yellow ....fathom	2 0 0	4 0 0
Lath, Dantsic ....fathom	3 0 0	5 0 0
St. Petersburg	4 0 0	5 10 0
Wainscot, Riga ....log	0 0 0	0 0 0
,, Odessa, crown	2 10 0	3 0 0
Deals, Finland, 2nd and 1st...std.100	7 10 0	9 0 0
,, 4th and 3rd	6 0 0	8 0 0
Riga	5 10 0	7 10 0
St. Petersburg, 1st yellow	8 10 0	14 0 0
,, 2nd ,, ...	7 0 0	8 0 0
,, white	6 10 0	8 10 0
Swedish	6 15 0	15 0 0
White Sea	7 0 0	16 10 0
Canada, Pine, 1st	16 0 0	24 0 0
,, ,, 2nd	10 0 0	15 10 0
,, ,, 3rd, &c.	7 0 0	9 10 0
,, Spruce, 1st	8 0 0	9 10 0
,, ,, 3rd and 2nd	5 0 0	7 0 0
New Brunswick, &c.	5 0 0	7 0 0
Battens, all kinds	4 0 0	10 10 0
Flooring Boards, sq., 1 in., prepared, First	0 8 0	0 11 6
Second	0 6 6	0 7 6
Other qualities	0 4 0	0 6 0
Cedar, Cuba ....foot	0 0 3½	0 0 3½
Honduras, &c.	0 0 3	0 0 3½
Australian	0 0 2	0 0 3
Mahogany, Cuba	0 0 4½	0 0 7
St. Domingo, cargo average	0 0 4½	0 0 6
Mexican ,, ...	0 0 3½	0 0 3½
Tobasco ,, ...	0 0 4	0 0 5
Honduras ,, ...	0 0 4	0 0 5
Maple, Bird's-eye	0 0 5	0 0 7
Rose, Rio ....ton	8 0 0	11 0 0
Bahia	7 0 0	9 0 0
Box, Turkey	5 0 0	12 0 0
Satin, St. Domingo ....foot	0 0 5	0 0 9
Porto Rico	0 0 6	0 0 10
Walnut, Italian	0 0 4	0 0 5½

METALS.		
ZINC—Bar, Welsh, in London...ton	0 0 0	0 0 0
,, ,, in Wales	0 0 0	0 0 0
,, Staffordshire, London	0 0 0	0 0 0
COPPER—		
British, cake and ingot ....ton	0 0 0	0 0 0
Best selected	0 0 0	0 0 0
Sheets, strong	90 0 0	0 0 0
Chili, bars	76 10 0	0 0 0

METALS (*continued*).	£. s. d.	£. s. d.
YELLOW METAL....lb.	0 0 0	0 0 0
LEAD—		
Pig, Spanish ....ton	14 15 0	0 0 0
English, common brands....	15 0 0	0 0 0
Sheet, English	16 0 0	16 5 0
SPELTER—		
Silesian, special ....ton	21 5 0	21 10 0
Ordinary brands....	21 0 0	21 5 0
TIN—		
Straits....ton	166 10 0	0 0 0
Australian	166 10 0	0 0 0
English ingots	0 0 0	0 0 0

OILS.	£. s. d.	£. s. d.
Linseed ....ton	19 0 0	19 5 0
Cocoanut, Cochin	28 0 0	29 0 0
Ceylon	23 15 0	0 0 0
Palm, Lagos	21 10 0	0 0 0
Rapeseed, English pale	26 5 0	0 0 0
,, brown	24 10 0	0 0 0
Cottonseed, refined	20 0 0	0 0 0
Tallow and Oleine	25 0 0	45 0 0
Lubricating, U.S.	5 0 0	6 0 0
,, refined	5 0 0	12 0 0
TURPENTINE—		
American, in casks ....cwt.	1 9 6	0 0 0
TAR—		
Stockholm ....barrel	0 15 0	0 15 6
Archangel	0 10 0	0 10 6

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

Nature of Work.	By whom required.	Premium.	Designs to be delivered.	Page.
School Building	Leathersellers' Company	Not stated	Feb. 21st	ii.
Shops, Offices, &c., Halifax	J. T. Riley....	15*l.* and 5*l.*	March 14th	ii.
Public Library and Reading-Room	Chelsea Pub. Lib. Com.	30 gs. and 20 gs.....	March 24th	ii.

CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders te be delivered.	Page.
Formation of Footpaths, &c., Highbury	Met. Board of Works...	*Official*	Jan. 24th	ii.
Granite Spalls....	West Ham Union....	do.	Jan. 25th	ii.
Alterations and Additions to Workhouse	Durham Union....	W. Crozier, Jun....	Jan. 27th	ii.
Wood Blocks (Creosoted and not Creosoted)	Folkestone Corporation	*Official*	Jan. 28th	ix.
Iron Bridge, Flood Prevention Works	Canterbury Cor.	Hall & Jennings	Jan. 30th	ii.
Unclimbable Fence	Kingston-on-Thms. Cor.	*Official*	do.	ix.
Cast-Iron Socket Pipes	Farnham Water Co....	do.	Jan. 31st	ix.
Cemetery Chapel and Lodge	Harrow Burial Board ...	Stoner & Sons	do.	ii.
Alterations and Additions to Premises, Yeovil	Wilts & Dorset Bnk. Co	G. M. Silley	Feb. 1st	ii.
New Premises, Axminster	do.	do.	do.	ii.
New Premises, Torquay	do.	do.	do.	ix.
Hotel and Stabling, Frodingham	Hewitt Bros....	E. W. Farebrother	do.	ix.
Wesleyan Church, Watford	The Trustees	R. Curwen....	do.	ix.
Stoneware Pipe-Sewer, Hammersmith	Met. Board of Works...	*Official*	Feb. 3rd	ii.
New Rooms, Offices, &c....	East Kent & Canterbury Conservative Club...	Cowell & Bromley....	do.	ix.
Works and Materials	St. Pancras Vestry	*Official*	Feb. 6th	ix.
Sinking Well and Making Artesian Boring ...	Braintree Local Board	J. Church	do.	ix.
Day and Jobbing Works....	Paddington Vestry	*Official*	do.	ix.
Relaying and Repairing Footways, &c.	do.	do.	do.	ix.
Granite for Repairing Roads	do.	do.	do.	ix.
Forming and Making-up Roads, &c.	Beckenham Local Brd.	G. B. Carlton	do.	ii.
Stabling and Cart Sheds	Hornsey Local Board ...	T. de Courcy Meade' ...	do.	ii.
Erection of Buildings, &c., Bournemouth....	Rl. Counties Agric. Soc.	*Official*	Feb. 8th	ix.
New Head Post-Office, Birmingham	Com. of H.M. Works...	do.	Feb. 14th	ix.
Works and Repairs to Public Buildings....	do.	do.	Feb. 16th	ii.
Reading-Room and Alteration to Library.....	Fulham Free Pub. Lib.	J. G. Hall	Not stated...	ix.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page
Surveyor	Hammersmith Vestry...	350*l.*	Feb. 1st	xiv.

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *Noon on Thursdays*.]

BERMONDSEY.—For alterations, &c., Coopers' Arms, Bermondsey, for Messrs. Charrington. Mr. W. Scott, architect:—

Greenwood	£879 0 0
Lascelles	865 0 0
Cox	750 0 0
Earle & Son	583 0 0
A. Hood (accepted)	453 0 0
Blocker	330 0 0

BERMONDSEY.—For alterations, &c., Manor Tavern, Bermondsey, for Messrs. Charrington. Mr. W. Scott, architect:—

A. Hood (accepted)	£187 5 0

BRIXTON.—For alterations and additions to the Russell, Brixton-road, for Mr. E. R. Coles. Mr. R. W. Collier, architect, 30, Lincoln's Inn-fields:—

J Beale	£802 0 0
W. Read....	797 0 0
R. Pearson	763 0 0
W. H. McLachlan	747 0 0
W. Reddish	633 0 0

IPSWICH.—For the erection of Girls' and Infants' Schools on the Bramford-road, for the School Board of the Borough of Ipswich. Mr. E. F. Bisshopp, architect, Ipswich:—

C. A. Wyatt	£4,718 0 0
Grimwood & Sons	4,498 0 0
C. Parker	4,400 0 0
R. Girling	4,377 0 0
A. Coe	4,176 0 0
T. Thwaites, Ipswich (accepted) ...	4,143 0 0
Everett & Son	4,136 0 0
O. T. Gibbons	3,725 0 0
R. S. Smith (withdrawn)	3,659 0 0

LONDON.—For alterations to No. 62, High Holborn, for Messrs. Müller & Co., including the rebuilding of façade, new roof, &c. Mr. H. Huntly-Gordon, architect and surveyor, 26, Craven-street, Charing Cross:—

T. Gobey, Lamb's Conduit-street (accepted)	£560 0 0

[Three other tenders received.]

LONDON.—For building warehouse, stabling, and house, Mansford-street, Bethnal Green, for Mr. Henry Whitmore. Mr. H. A. Wooster Reeves, architect, Colchester:—

Hearle & Son....	£2,885 0 0
Beale	2,803 0 0
Robson	2,697 0 0
Hughes	2,638 0 0
Watson	2,600 0 0
Forest	2,590 0 0
Wood	2,587 0 0
Shurmur	2,547 0 0
Jackson & Todd	2,493 0 0
Diss	2,450 0 0
George Lusk....	2,297 0 0

LONDON.—For new factory and warehouse at Churchway, Somers Town, St. Pancras, for Messrs. Connolly Bros., leather merchants. Mr. John Saville, architect, 1, Argyle-square, W.C.:—

Hawkins	£1,309 0 0
Fowler Bros.	1,227 0 0
Taylor	1,186 0 0
Spencer & Co.	1,160 0 0
Lambls	1,137 0 0
G. Veale....	1,090 0 0
Sabey & Sons....	1,045 0 0
Ward & Lamble	973 0 0

LONDON.—For alterations, &c., to the Britannia beer-house, Cambridge-road, E., for Messrs. Peron. Mr. E. Clarke, architect:—

Smith	£1,095 0 0
Green	979 0 0
Henley....	926 0 0
Beale	918 0 0
Bishop Bros.	865 0 0
Richardson....	853 0 0
Hood (accepted)	748 0 0

LONDON.—For alterations and repairs to Nos. 3, 5, and 7, Prospect-place, Cambridge Heath, for Mr. F. Garner:—

Ivery	£356 0 0
George Lusk....	350 0 0
Bardwell....	332 0 0
J. & F. Bane....	285 0 0
Warland....	225 0 0
Mower....	195 0 0
Jackson (accepted)....	148 0 0

LONDON.—For alterations, &c., to premises, No. 128, Strand, for Messrs. J. Greenwall & Co. Mr. Lewis Solomon, architect, 55, New Broad-street:—

F. Sage & Co.	£660	0	0
Drew & Cadman	596	0	0
Smith Bros.	596	0	0
S. Yardley & Sons (accepted)	557	0	0

LONDON.—For carpenter's and joiner's work, office fittings, &c., at the Mayfield Sanitary Laundry, 93, Gillespie-road, N., for Messrs. Thomas & Taylor, Laundry and Dairy Engineers, 80 and 82, Lower Hillgate, Stockport:—

F. Blandford, 21, Avenue-road (accepted). £175 0 0

[No competition.]

MILE-END.—For alterations and additions to the Hayfield Tavern, Mile-end, for Messrs. Charrington. Mr. W. Scott, architect;—

A. Hood (accepted)	£1,879	6	0

PECKHAM.—For the enlargement of the Woods-road School, Peckham (East Lambeth Y), by 200 places, for the School Board for London. Mr. T. J. Bailey, architect:—

L. Bottoms	£3,058	0	0
Scharien & Co.	2,851	0	0
J. W. Bunning & Son	2,848	0	0
T. Bendon	2,692	0	0
J. Ford & Sons	2,677	0	0
W. H. Lorden & Son	2,649	0	0
J. Marsland	2,625	0	0
J. & C. Bowyer	2,538	0	0
H. Hart	2,484	0	0
Kirk & Randall	2,483	0	0
W. Johnson	2,398	0	0
C. Wall	2,388	0	0
H. L. Holloway	2,383	0	0
Stimpson & Co.	2,380	0	0
W. Downs	2,356	0	0
Norris & Luke*	2,226	0	0
J. O. Richardson	2,161	0	0

* Recommended by the Works Committee for acceptance.

SOUTH SHIELDS.—For erecting boundary-walls and main entrance for new cemetery, Harton, for the South Shields and Westor Burial Board. Mr. Henry Grieves, A.R.I.B.A., architect, South Shields. Quantities by Mr. Geo. Connell, Newcastle:—

Sneck Walling.

Wm. Scott, South Shields	£2,357	0	0
J. Elliott, North Shields	2,350	0	0
S. Sheriff, South Shields	2,165	0	0
W. & W. Scott, Newcastle	2,159	3	7
Goodwin & Son, South Shields	2,156	15	8
R. Allison, Whitburn	2,004	12	2
Hudson & Co., South Shields*	1,755	10	1

* Accepted.

Rubble Walling (alternative).

Wm. Scott, South Shields	£1,912	10	0
W. & W. Scott, Newcastle	1,738	19	7
Jos. Elliott, North Shields	1,714	0	0
Hudson & Co., South Shields	1,641	16	7
Goodwin & Son, South Shields	1,617	16	7
S. Sheriff, South Shields	1,515	0	0
R. Allison, Whitburn	1,514	3	6

STEPNEY.—For the enlargement of the Baker-street School, Stepney (Tower Hamlets G), by 400 places, for the School Board for London. Mr. T. J. Bailey, architect:—

Norris & Luke	£5,246	0	0
Atherton & Latta	5,200	0	0
H. Hart	5,150	0	0
F. & F. J. Wood	5,117	0	0
H. L. Holloway	5,102	0	0
Scharien & Co.	5,074	0	0
Barrett & Power	4,940	0	0
C. Wall	4,890	0	0
W. M. Dabbs	4,766	0	0
W. Johnson	4,761	0	0
Stimpson & Co.*	4,700	0	0

* Recommended by the Works Committee for acceptance.

TUNBRIDGE WELLS.—For pulling down and rebuilding house, for Mr. J. Griffiths. Messrs. H. H. & E. Cronk, architects:—

Soper & Jones	£878	0	0
T. Hudson	797	0	0
Beale & Son	733	0	0
R. Brown	722	10	6
G. Edwards	698	10	0
J. Jarvis	697	0	0
E. Thurbon (accepted)	695	15	0

WANDSWORTH.—For two houses in Keswick-road, Wandsworth. Messrs. Lee Bros. & Pain, architects, 8, Adelphi-terrace. Quantities supplied:—

Lapthorne	£4,626	0	0
Lathey	4,470	0	0
Avis & Son	4,469	0	0
John Gibbs	4,148	0	0

WHITECHAPEL. — For repairs and alterations to 44, Middlesex-street. Mr. R. W. Hobden, architect, 14, Devonshire-street, E.C.:—

George Lusk	£200	0	0
S. W. Hawkins	198	0	0
Storckley	188	0	0

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